THE MARINE RECORD

ESTABLISHED 1878

VOL. XIX. NO. 29. CLEVELAND—JULY 16, 1896—CHICAGO. $2 PER YEAR. 10c. SINGLE COPY

THE NEW TORPEDO BOATS.

In the present appropriation for the navy provision is made for the construction of three torpedo boats, to cost in all not over $800,000, and for the construction of not more than ten other torpedo boats with a total cost limit of $500,000. The boats are to be throughout of domestic manufacture, and no premium is offered for excess of speed. The contracts for the construction of these boats must be made on or before October 8, 1896.

The three boats first mentioned are to have a speed of 30 knots an hour and to maintain an average of the same for that period under conditions to be prescribed by the Secretary of the Navy. Bids for these boats are invited upon plans to be submitted by the builder, including the engines as well, and the contract price is to include the boats complete in all respects excepting sea stores and ordnance and ordnance outfit of all kinds. Omitting the necessary dimensions of rapid-fire 6-pounder and 1-pounder guns and torpedo discharges, together with weights and sizes of ammunition cases, the bidder is unhampered in every particular, and to his judgment and designing skill is left the planning of these craft. There will be two conning towers, one forward and one aft, in convenient positions; and accommodations will be provided for four commissioned officers and an adequate crew. The boats will be lighted by electricity, but there will be no search-lights.

The exact number, size and speed of the smaller boats not being fixed in the act of Congress, the department will entertain bids for boats of two separate types, provided always that the total cost of these boats, including ordnance supplied by the Government, does not exceed $500,000.

Type No. 1 requires an average speed of not less than 20 knots, to be maintained for two consecutive hours. They will have two conning towers, or sighting hoods, placed in convenient places forward and aft. The freeboard forward to be not less than 4 feet 3 inches; and accommodations must be provided for two officers and an adequate crew.

The following approximate dimensions are given: Length on load line, 105 feet; beam on load line, 12½ feet; mean draft, 4½ feet; displacement, about 68 tons; indicated horse-power, about 850; speed per hour, 20 knots. Armament: Two single deck torpedo guns; one 1-pounder rapid fire gun; two automobile torpedoes; 180 rounds 1-pounder ammunition. If the speed fall below 20 knots an hour, and exceed 19 knots, the boat will be accepted at a reduced price. If below that, acceptance at a lower price will be in the discretion of the Secretary.

Type No. 2 requires an average speed of 22½ knots an hour, to be maintained for two consecutive hours. Length on load line, 140 feet; beam on load line, 14½ feet; mean draft, 4¾ feet; displacement, about 105 tons; indicated horse-power, about 1,700; speed an hour, 22½ knots. Armament: Three single deck torpedo guns; three 1-pounder rapid-fire guns; four automobile torpedoes; 540 rounds 1-pounder ammunition. If the boat attain a speed of 21½ knots, she will be accepted at a reduced price. If the speed fall below that, the boat may, at the discretion of the department, be rejected, or accepted at a reduced price.

The Wm. Cramp & Sons Ship and Engine Building Co., the Newport News Shipbuilding and Drydock Co., the Union Iron Works, Columbia Iron Works, the Bath, Me., Iron Works, and the Herreschoffs will bid on the torpedo boats. The Crescent Shipyard, Elizabeth, N. J., John A. Dialogue & Sons, and Moran Bros. have also applied for copies of the specifications. So far no intimation has come to the department that any bids will be made from the Mississippi River and the United States coast of the Gulf of Mexico, the laws authorizing the construction of the torpedo boats directing that, if possible, one of the boats be built in each of those localities. It is the expectation of the department officials that the Secretary will have to waive this provision in the law, as he did last year, on account of lack of bidders, and award the contract to some eastern or western firm.

It is reported at the Navy Department that President Hyde, of the Bath Iron Works, has sent to England for the plans on which the fast torpedo cruisers of the British navy are constructed, and proposes to submit them to the department with a bid for the construction of the vessels on these lines.

THE BURNING OF THE YACHT THELMA.

An investigation of the accident to the twin-screw naphtha yacht Thela, owned by Mr. J. Adolph Mollenhauer, of Brooklyn, which was burned while cruising on Long Island Sound on Tuesday, was made by the Gas Engine & Power Company, who are the builders of the yacht, on Wednesday of last week. They find that the accident was caused by the engineer removing the injector valve from the retort of one of the engines, while the other engine was running under pressure with the regular fire under retort; the naphtha vapor escaping through the opening left by the disconnected valve ignited from the flame under the retort of the other engine, and the yacht being under way caused a draft to fan the flames, thereby communicating with the woodwork. These facts are further substantiated by the following letter which the Gas Engine & Power Company received to-day from Mr. Mollenhauer. There was no explosion from the naphtha tanks as erroneously stated, as they were found perfectly intact and containing full supply.

BROOKLYN N. Y. July 8.

Gas Engine & Power Company, Morris Heights, N. Y.

GENTLEMEN:—As a matter of justice to you, being the builders of my twin-screw naphtha yacht Thelma, which was burned last Tuesday, I wish to state that the yacht or its machinery was in no way to blame for the accident. It was entirely owing to the carelessness on the part of the engineer in charge removing the injector valve from one engine while the other engine was running, the escaped naphtha thereby igniting. My confidence in the safety of your naphtha boats is such that I shall place an order with you at an early date for another boat. Regretting this unfortunate affair, believe me,

Yours very truly,

J. ADOLPH MOLLENHAUER.

CANADIAN SHIPPING LIST.

The Canadian shipping list for the year 1895 shows the total number of vessels on the register book of the Dominion on January 1 last, including old and new vessels, sailing vessels, steamers and barges, as 7,262, measuring 825,836 tons registered tonnage, being an increase of 17 vessels, and a decrease of 43,788 tons register as compared with 1894. Assuming the average value to be $30 a ton, the value of the registered tonnage of Canada would be $24,775,080. The number of new vessels built and registered in the Dominion during last year was 250, measuring 16,270 tons registered tonnage.

A Spanish cruiser has been launched by the Hong Kong & Whampoa Dock Co. The new vessel is 155 feet long, 23 feet broad, with a depth (moulded) of 11 feet. She is fitted with triple-expansion engines, and has 500 horse-power. The guaranteed speed is 11½ knots on a two hours' trial, and the vessel is fitted to carry enough coal to enable her to steam 2,500 knots at full speed.

THE PASSENGER STEAMER UNIQUE.

The name of this boat is synonomous with speed. Certainly she goes fast, and she needs to, for two long trips a day to and from Detroit, one from Port Huron and the other from Marine City—making what stops her passenger list calls for. On the Unique the Old Club is reached within an hour and a half after leaving the wharf foot of Shelby street. That is at the rate of 18 to 20 miles an hour. And all the time there is the feeling that the boat has a reserve of speed which, if occasion demanded, could be relied on to increase it to 23 or 25 miles an hour, so evenly and steadily does she cut her way through the water. The Unique can well say that she gives the fastest regular transportation to and from Detroit ever furnished to the inhabitants along the Flats and the St. Clair River. The trip from Port Huron to Detroit is made in 15 minutes less than four hours—she leaves at 6:30 and arrives at 10:15—and when it is considered that the flyer touches not only at Marine City, St. Clair and all Flat points on signal, the actual speed must necessarily be close to 20 miles an hour, if it does not exceed it.—Detroit News-Tribune.

The above extract refers to the steamer Unique, which has now been fitted with Roberts boilers for nearly a year. They are carrying 250 pounds of steam, and making 225 revolutions per minute with their big quadruple expansion engine. The boilers are run on the closed fire-room principle under an air pressure equivalent to about two inches of water. The boat has never lost a minute on account of the boilers since they were put in last fall. Our readers will probably recollect that this boat had Ward boilers in her two years ago which lasted fifteen days, and that the season was lost through taking them out. Then the boat was fitted a year ago with Babcock & Wilcox boilers, resulting in their failure in about three weeks with loss of three lives. The Roberts' guarantee consisted in giving the owners of the boat six months in which to try the boilers after they were shipped, with the privilege of returning the boilers at their expense or sending them a check at their option. Roberts got the check at the expiration of the time, and a very favorable and complimentary letter. —Marine Journal.

NOTES.

The American Merchant Marine Association, of which Charles H. Cramp is an active member and chairman of the executive committee, has issued a vigorous statement in which it is announced that "Protection to American ships in the foreign trade will be one of the issues of the coming campaign."

It may not be generally known that the sails of a vessel are so instrumental in focusing sounds that with a steady breeze and a smooth sea instances are on record of bells chimed on shore at a distance of many miles, as well as other noises, being heard distinctly, close to a large sail, but not elsewhere on board a vessel where the breeze blew clear through her rigging.

"When my ship comes in," is a saying that originated in Bristol when that port was in its flourishing days. It was the custom for the tradesmen of the city to give credit to the sailors' wives, who promised to pay for their goods on the return of the ships on which their husbands were serving. The saying, however, soon obtained a wider meaning.

A Yokohama correspondent in a letter dated June 8 says: "The U. S. cruiser Olympia reached Hakodate from Vladivostock on Thursday, June 4, was inspected on the 5th and 6th, and left there for Yokohama on the 6th at 1:30 p. m. On June 7 the Olympia had her four-hour natural draft steam trial, making 80¾ miles in four hours even, or an average of 20.94 knots, nearly 22 statute miles an hour. This is pronounced the best record ever made on a four-hour natural draft trial by a cruiser. The conditions were favorable. There was a smooth sea and no strong wind."

NEWS AROUND THE LAKES.

CLEVELAND.

CONTINUED ANNOYING DELAYS IN THE PROPOSED HARBOR IMPROVEMENT—THE NORTHERN STEAMSHIP CO.'S NEW WHARF.

CLEVELAND, July 16.

The ancient proclivity of Cleveland people to try to accomplish large results by endless talking is doing much to delay the harbor improvements that have been projected, and important ends seem likely to be sacrificed by fritering over trifles. There is alleged to exist an old contract with the Lake Shore Railroad by which the road is said to have agreed to put in a drawbridge at the head of the old river bed should the city ever make such a demand. Powwow politicians are finding this convenient subject matter for a howl about the city's rights, possibly to divert attention to the many sacrifices of really important city interests in times past.

The controversy is being nursed by the newspapers for sensational ends, and by misquotations and misrepresentation of facts they have worked up a sham battle between Col. Jared A. Smith, United States engineer, and Mayor McKisson. It is quite possible that these officials entertain no overpowering admiration for each other; but the statements attributed to them, and particularly to Col. Smith, are such as would make the situation very embarassing for him at Washington, were it not that the officials there are too well acquainted with his intelligence and discretion to pay any attention to the absurd statements of newspapers which are rapidly degenerating from positions of respect and influence to the level of ordinary mischiefmakers. Col. Smith needs no defense, but a short resume of the history of the harbor improvement project may have an educational effect in pointing out where lies the blame for the delay and demonstrating that what have been given out as facts regarding ordinary procedure under the discipline of the U. S. Engineer Department have been deliberately misinterpreted to place Col. Smith in the light of an arbitrary blusterer, who is trying to hold the city up by the tail, and that city officials have been pictured as resenting this in a style which displays an astonishing ignorance regarding ordinary business procedure.

Col. Smith has been wide-awake to the possibilities of this, as well as other ports under his jurisdiction, and has always directed his plans as far as possible with the money at his disposal, to the more permament interest of the port. As the regulations forbid engineers to make in their reports to the department any outlines of new projects, Col. Smith has in some cases made informal suggestions to local interests, leaving them to take the initial steps. This was the case when he found it was necessary to rebuild the west pier. The cost of its construction would be no greater if it were built so as to widen the river than if it were erected on the old site, unless the government should be put to the extra expense of acquiring lands. Col. Smith then, in a few remarks at a meeting of the Maritime Board of the Chamber of Commerce, some seven or eight months ago, stated the facts and suggested that the Lake Shore Railroad Co. would be willing to sell the land for a small amount—probably only sufficient to pay the expense of building protections for its swinging bridge pier, which would then be in the middle of the river, instead of at one side. The suggestion was taken up with enthusiasm; and a committee was appointed to look over the ground, and to obtain an informal statement from the Lake Shore Co. as to what it was willing to do in the matter. President Caldwell, of the Lake Shore, informed this committee that the company would cheerfully donate the land, provided the city would agree to release all of its alleged rights to open the old river bed. When this committee reported to the Maritime Board, the proposal was received with great favor; but the Board in its enthusiasm, failed, we believe, to do anything more than receive and approve the report, and no resolution or memorial was adopted, nor were any other steps taken to bring the matter before the city administration. The Board may not have wished to endorse the proposition without investigating the old river bed subject, but this should have been followed up and considered. There is no longer a single interest in favor of creating such an opening, with the exception of the contractors who would be awarded the job, which would certainly prove a bonanza, owing to the extra amount of work it would afford for them in all seasons to come. On the other hand such an opening would create a shifting current up and down the channel which would have the effect, with the wind in certain directions, in driving the sewage from the main river up the river bed, where the water is now comparatively free from this sort of impurities. The upper draw would be as far from the ore docks as the main river entrance, and after the draw should be passed there would be a quarter of a mile additional distance to the outer harbor entrance.

In this connection the many indications that the lake front, between the river and the shore arm of the breakwater, will within a few years, be occupied by docks, must be considered. Any channel that would be practicable from an engineering standpoint would cut off from 15 to 20 per cent of this dock room which is to be so valuable some time, and this space, owing to the topographical peculiarities, would be inaccessible to traffic, except by way of a second drawbridge, on a lower level than the proposed Lake Shore draw. This would be an annoying complication and would greatly reduce the value of the property thus isolated.

The city has nothing to gain for such an opening except for its marine interests. Now, since these interests are either indifferent or opposed to such a measure, why cannot the city officials proceed and trade this worthless claim—which they could never enforce, by the way, in any court—why do they not exchange it for the really valuable concessions proposed by Mr. Caldwell on behalf of the Lake Shore road? The new harbor would then be assured, and the waste of four or five months valuable time need not be further increased. If the administration does not wish to do this without some formal expression of opinion from those directly interested, this could be obtained without trouble.

Col. Smith has made his estimates on a new pier on the new site, and has expressed his belief that the city will take such steps as to render the new work possible. He is expected by his superiors in office to follow this statement up with something tangible, or else to submit new plans involving only such lands as the government is now certain of, which is the site of the old pier. Some prompt movement is absolutely necessary. Cannot the authorities drop politics and accomplish something for the good of the city, this centenial year?

The lake front landing of the Northern Steamship Co. has been completed, and will be used from this time forward. The landing is reached by a bridge over the railroad tracks and a well-protected approach the entire distance from the foot of Water street to the lakes. This new dock well repays a personal visit, even if no trip is contemplated, and speaks additional volumes for the enterprise of the Northern Steamship Co.

The B. & O. people expect to expend berween $400,000 and $500,000 on their dock property in Cleveland before next spring. The plans are not yet matured.

The men of No. 4 engine house, on the west side, recently built and launched a very nice yacht about 45 feet long. A race is arranged for next Saturday between this yacht and the Jane, which is in charge of Capt. Chas. L. Motley, of the life-saving crew. The Jane is a yawl-rigged boat 44 feet over all and 30 feet on the load water-line, by 10½ feet beam. She draws 6½ feet. She was built last year at Port Huron by Lieut. Moore, a former inspector of the life-saving service, who had no sooner completed her than he was transferred to Florida. He has left her with Capt. Motley until she can be disposed of. The Jane is a comfortable yacht, especially adapted for cruising; but she is fast as well, and can show a clean pair of heels to almost anything of her class.

Mr. H. F. J. Porter, of Chicago, delivered a very interesting address last Tuesday evening before the Civil Engineers' Club on the process of manufacture of steel forgings. His paper was illustrated by means of a stereopticon, and was most thoroughly enjoyable and instructive. He contributes to THE RECORD this week a very excellent paper on the same subject, which embodies some of the principal features of his talk.

The steamer Beta and three barges of the Cleveland Canalboat Co., reached port Monday night from New York with a sugar cargo. The fleet will all be completed soon, and the company will then get down to its regular weekly schedule.

CHICAGO

FINE SPEED SHOWING MADE BY THE NEW STEAMER IOWA—A HEAVY FRUIT TRADE.

OFFICE OF THE MARINE RECORD,
July 15, 1896.

The Goodrich Transportation Company's new steamer Iowa, rebuilt by H. B. & G. B. Burger at Manitowoc had a trial trip on Lake Michigan last week. Her machinery was given a thorough test and worked very satisfactorily. She made the run between Two Rivers and Manitowoc, a distance of six miles from light to light, in twenty-two minutes, a trifle better than seventeen miles per hour. The speed attained by her was beyond the anticipations of the president, superintendent and chief engineer of the company, who were more than pleased with her performance. The decorators and furnishers are on board giving the finishing touches to her fine saloon cabin and state rooms and she will go into commission in a week or so.

The Virginia got a log in her port wheel and broke off one of the blades when leaving Milwaukee for Chicago Sunday afternoon with a full load of passengers. She brought the passengers to Chicago and then went back to Milwaukee and was put in dry-dock and received a new wheel. She started on her regular time Monday afternoon for Chicago. The Indiana filled in the Monday morning trip.

The old whaler Progress has at last been removed from her berth on the bottom of the south pond at Jackson Park. The Newton Bros. will refit the craft and put her in good shape again. Then she will be taken to New York to serve as a training ship for merchant seamen. The entrance to the south pond was so filled with drifting sand that the old barque had to be hauled over the tongue of land that divides the pond from the lakes. She rested on her side on the bottom in shallow water. Rollers were put under her, and a long hawser was passed over the land to the tugs stationed in the lake. The old ship was then hauled bodily across the land into the lake.

Calbick & Sullivan are now writing fire risks at No. 6 Sherman street. The firm is composed of Capt. J. A. Calbick, who has been in the marine insurance business for many years, and J. J. Sullivan, who was in the brokerage business.

The steamer Raleigh, going down the river Sunday morning, ran into the Graham & Morton Company's steamer City of Chicago, lying at the company's dock, foot of Wabash avenue. The Raleigh struck the City of Chicago forward of the paddle box on the starboard side and broke several carlines and some rail and did other damage to her upper works.

Enormous quantities of fruit are arriving here from Michigan daily by the steamers from St. Joseph and Benton Harbor, South Haven, and Saugatuck. The Graham & Morton boats alone bring nearly forty thousand cases, baskets and barrels of fruit daily.

Capt. C. E. Benham, of Cleveland, is in Chicago this week.

Lumber cargoes are scarce and the freights paid are so low that there is nothing in it for the vessels after the wages, tow bills and charges for loading and unloading are paid. Grain freights have gone down to 1c on corn to Buffalo and there is very little business doing at that low rate.

THOMAS WILLIAMS.

BUFFALO.

INTERESTING REMINISCENCES OF THE LATE CAPT. MCKAY—CHRONIC SHORTAGES—BUSINESS FAIR.

BUFFALO, July 14.

Special Correspondence to The Marine Record.

There is much the same condition of things in port that has prevailed for the past month or so. Buffalo is doing her share of business, though that is not saying much. Everything is doing fairly well but coal shipments, with lumber next in slackness. Grain is coming in faster than was expected, but coal is very slack and promises nothing better right away. There is something wrong in the statistics on the shipments, for one paper makes them 70,000 tons for the week and another 65,000. This is away off, if I know anything about it and a leading broker ventures to say that he is sure it is wrong, for with last week going some days without a single boat placed for coal, these reports make the movement well up to average.

It appears to be the Ryan elevator, at Black Rock, that is doing the grain handling just now. For the first time in the history of the port vessels of almost first size, like the Davidson and the Vance, have gone down there and unloaded grain. Most of it is oats from Milwaukee, though the elevator also catches about all the canal schooners from Toledo. The elevation is done by water power, and as the house is out of the elevator pool and the grain is taken direct and shipped by canal there is prospect of some one making some money.

It is rather amusing to note the challenge that was sent out from Milwaukee when the steamer Davidson left there with her third cargo of oats. She had been short on the two former trips, first 272 bushels, then after changing the tallyman, 384 bushels. If she is short when she gets here this time there will be blood on the moon, especially after the Milwaukee Chamber of Commerce has accused our tallymen of crookedness—when people were not looking.

There may have been a lurking suspicion somewhere that this port was not very speedy in ore handling, no matter if the other ports of the world couldn't touch it in grain and coal handling. That was before the new hoists were put in at the Lehigh docks. There are now six of them, and when the steamer City of Bangor went up there last week they were all ready for her. The result was that the boat was relieved of 3,300 gross tons of ore and went out just 36 hours after arrival with 3,400 net tons of coal. If this record has been beaten, car loaders or any other apparatus thrown in, the fact has not reached here.

There was a notion that the Anchor Line was sending more of its freight to Erie than common, but that is said, by authority, not to be so. The boats are running to Buffalo, Erie and Fairport, just about as usual. The line has a contract to carry 80,000 tons of coal out of Erie this season, but will not take much of it till fall.

There seems to be nothing in luck after all. If there had been Capt. McKay would not have gone down with his barge, the Little Wissahickon. The boat went out from here in the Donaldson tow last Wednesday night and went down before reaching Point au Pelee, taking the captain and two of the crew with her. In his long life afloat Capt. McKay had seen rather more than the usual amount of peril. He has hung for days on the yard arm of his sunken vessel and more than once he was the only survivor. Several years ago he gave me material for a long chapter of adventure, in which he never regarded himself at all in the light of a hero, but rather as one specially favored of Providence. He was of a deeply religious turn of character and believed that he was safe from harm. This was when he was sailing the barge Antelope. As master and owner of the Little Wissahickon age began to tell on him and as it turns out he should have left sailing to younger men and enjoyed the rest he had well earned in his neat home in Bay City.

There is not a very good report from excursion boats. Some of them may make a little money, but it looks

now as though there were about twice as many to divide the earnings among as there should be. The story of the sale of the Ziegler boats to New York parties is revived, but there is room for doubt about the deal still.

The lake lines are spending most of their spare time fighting over west-bound canal rates and when they get through they say there will not be much left of either the Cleveland Canalboat Line or John Gordon, whether any of them survive or not. East-bound rates are holding better, as they are about as low as they can be. The combination is in all sorts of shapes this summer and appears to be small comfort to any one.

The Earhardt Liner Farwell has been down from Duluth with her first load of flour for canal shipment and the experiment is well under way. Old through shippers say it will not work, but there is so much in it for the future of the canal that it ought to.

JOHN CHAMBERLIN.

DULUTH AND SUPERIOR.

THE BRIDGE CONTRACT LET—MORE JUNE STATISTICS—LABOR TROUBLES.

To the Editor of The Marine Record:

DULUTH, July 14.

Contracts have been let by the Duluth-Superior Bridge Co. to Alexander McGraw, of Philadelphia, and to the Pennsylvania Steel Company, for the construction of a combination railway, street car, wagon bridge to extend from Rice's Point to Conner's Point. The former will have the building of the substructure while the latter will have the erection of the superstructure. This bridge will form an additional link between the railroad systems of the two cities, which are now connected only by two single-track bridges. The substructure will be of masonry piers and abutments on concrete and pile foundations. The bridge proper will be composed of one 400 ft. draw span and two 300 ft. through truss spans, and will have a 20 ft clearance above surface of water. Two railway tracks will occupy the 28 feet between trusses, outside of which on either side will be a space of nine feet for wagons and street cars, while outside of these a four-foot walk will be built. It is the intention to have the work all completed by the opening of navigation of 1897. A. P. Roller, of New York City, is consulting engineer of the company.

The lumber shovers' union of Duluth declined to load the Nester and Bourke Friday unless the vessels would allow ten cents extra per hour per man. The demand was made on the strength of a request from the union at Baraga, which organization said the owners of the vessels had loaded lumber at that point with non-union labor. The regular scale of the union is 40c an hour, and the Duluth union declined to load the vessels unless 50c per hour was paid. There seemed to be no way outof the difficulty and the extra rate was paid, the additional 10c per hour making about $100 per vessel.

Coal receipts at Duluth during the month of June aggregated 122,619 tons, During the same month last year they were only 33,225 tons. At Superior the total receipts in June were 240,558 and a year ago they were 68,074 tons. The demand for soft coal is better. The high prices of anthracite coal has had the effect of making dealers delay their purchases. It is believed that another raise of 25 cents a ton can be depended upon to come September 1st. None of the companies have sent out their traveling salesmen as yet. They are watching the market closely, however, and will go out during the latter part of this month or early in August.

There port for June of Deputy Port Collector R. J. Shields, given below, shows a vast increase in the traffic of the port of Superior from last year:

RECEIPTS.	JUNE. 1896	JUNE. 1895
Coal, tons	240,558	68,474
Merchandise, packages	20,247	43,048
Merchandise, tons	945	390
Salt, barrels	14,510	12,500
Oil, barrels	28,993	87
Cement, barrels	2,160	.....
Manufactured Iron, tons	2,185	.....
Staves, (imported)	400,000	.....
SHIPMENTS.		
Flour, barrels	402,017	518,609
Wheat, bushels	1,645,000	352,000
Coarse grains, bushels	279,000	2,000
Bran, sacks	12,550	2,200
Feed, sacks	4,800	2,600
Lumber, feet	1,450,000	2,125,000
Shingles, packages	200,000	16,000,000
Iron ore, tons	29,451	4,500
Copper, tons	730	429
Manufactured Iron, tons	30	...

In addition to the above shipments, there were 29,300 barrels of flour and 232,500 bushels of wheat shipped to foreign ports. The arrivals and clearances amounted to 436 vessels, against 233 a year ago.

Lumber shipments by lake were quite active during June, and the aggregate of the season up to date is about 100,000 feet. The stocks sold have been well moved, and shipments for July are light.

FLOTSAM AND JETSAM.

A valuable vein of coal is reported to have been discovered near Flushing, Mich.

Arthur M. Carter has been appointed keeper of the light station at Windmill Point, Mich.

Capt. Charles Grant has been promoted from barge 132 to be master of the steamer E. B. Bartlett.

The burned Cargill elevator at Green Bay is to be replaced with a structure costing $750,000, with storage capacity for 500,000 bushels of grain.

The Detroit postoffice delivered or received mail from 3,476 vessels in June. Only five vessels were missed, due to the small boat's tow line parting.

Supervising Inspector Galwey has removed his office from the Buhl Block, Detroit, to the southeast corner of the new Parker & Millen building, foot of Griswold street.

The new tug S. M. Fischer towed the W. & M. barges 1, 2 and 4, with eighty cars aboard, from South Chicago to Sturgeon Bay Canal, in 33 hours. The distance is 217 miles.

The Saginaw Coal Co. has sunk sixty feet of its shaft which is to go down about 145 feet. The quicksand strata has been passed through, and the work is now through solid clay.

COL. G. J. LYDECKER,

The steamer Canisteo is under charter for six trips to carry basswood lumber from Menominee and other Green Bay ports to Oswego for making starch boxes. The six cargoes will aggregate about 4,350,000 feet.

The Chicago & Northwestern is dredging out a new slip at Manitowoc, running southward from a point just nside the South Harbor pier; also a breakwater 3,000 feet long, 60 feet outside the shore line. The slip is to be used for the transfer of cars from Ludington and Frankfort by car ferries.

It is stated that the steamer F. & P. M. No. 4, now receiving a thorough rebuild from the water line up, will, when completed, become the property of the Hudson Transportation Co. The F. & P. M. No. 1, lately bought by Capt. Hudson, is doing good business between Chicago and Milwaukee.

Messrs. John Platt & Co., consulting engineers, Fidelity Buildings, Nos. 98-103 Cedar street, New York, have taken the sole agency for America of the Thornycroft water-tube boilers. These are the boilers employed in some of the swiftest of the British torpedo boats, some of which have records of over 30 knots per hour. They have also the agency for the Thornycroft automatic feed regulator.

COL. LYDECKER THE CHOICE.

It is now semi-officially announced that Lieut. Col. Garrett J. Lydecker, now in charge of numerous river and harbor improvements in Michigan, has been designated to take the post formerly filled by the late Col. O. M. Poe. This appointment is due to Col. Lydecker's splendid record in the work in which he has been in charge for some years, and the resulting confidence reposed by his superior officers in his energy and ability.

The formal order assigning him to the post enumerates his responsibilities as follows: In charge of the defensive works at Fort Wayne, Mich.; of the improvement of the harbors at Michigan City, Ind.; St. Joseph, including Benton Harbor canal; South Haven, Saugatuck, Holland (Black Lake), Grand Haven, Muskegon, White Lake, Pentwater, Ludington, Manistee, Frankfort, Charlevoix, including entrance to Pine Lake; Petoskey, Cheboygan, Portage Lake, Sand Beach, and Alpena, Mich; in charge of the improvements of St. Joseph and Saginaw Rivers; Black River, at Port Huron, mouth of Black River, Clinton and Rouge Rivers, and the construction of the turning basin in Rouge River, Mich.; to supervise the construction of bridges across the Rouge River, near Detroit, and between the townships of Springwells and Ecorse; across Muskegon Lake; across Muskegon River at Muskegon; at Manistee River; at Manistee; across Saginaw River; the improvement of the St. Mary's River at the falls; the St. Clair Flats ship canal, Detroit River, Mich.; Hay Lake channel at the St. Mary's River, and of the ship channel connecting the waters of the Great Lakes between Chicago, Duluth and Buffalo; of the construction of dry-docks, St. Mary's Falls canal; of dredging at Grosse Pointe channel, and of St. Clair Flat canal and St. Mary's Falls canal, Mich.; of issuing charts of northern and western lakes; of water level observations on Lake Huron, and the removal of wrecks in St. Clair River, Mich.; member of the board of engineer officers to examine and report upon the subject of harbor lines on the west bank of the American channel of Detroit River.

Col. Lydecker was graduated from West Point at the head of the class of 1864. He graduated on Saturday and instead of taking the usual furlough allowed cadets, he promptly, on the Monday morning following, reported to Gen. Meade, of the Army of the Potomac, and served as engineer on his staff till the close of the war. In 1866 he was intrusted with the construction of the St. Clair Flats canal. After that he had charge of river and harbor work at different stations, and stood so high in point of efficiency that during President Arthur's administration he received the appointment of engineer commissioner for the District of Columbia, in addition to which he had charge of the construction of the present waterworks system of the City of Washington. Col. Lydecker has been for the last four years in charge of the river and harbor work on the east coast of Lake Michigan and the west coast of Lake Huron.

NOTICE TO MARINERS.

PORT CLINTON LIGHT STATION.

The Lighthouse Board gives notice that on or about July 15, a fixed red lens-lantern light will be established in the structure recently erected on the west pier, about 20 feet from its outer end, at the entrance to Port Clinton Harbor, south side of Lake Erie, near its westerly end. The light will illuminate 180° of the horizon and will be visible from all points of approach from the lake. The focal plane of the light will be 25⅔ feet above mean lake level, and the light will be seen about 8 miles in clear weather.

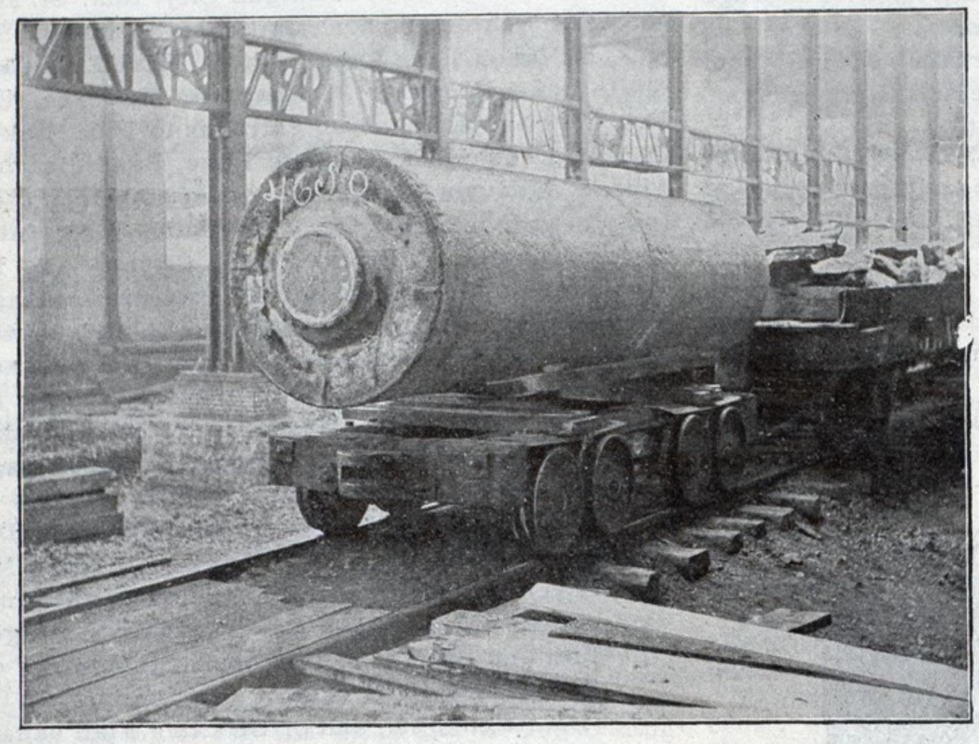
The light will be shown from an octagonal lantern surmounting a square, pyramidal, wooden structure, with gallery at the top, on a platform of piles. The structure is yellow with white trimmings and brown foundation timbers. Direction of pier, N. 21° E. (N. by E. ⅞ E.); Green Island lighthouse, N. 22° E. (N. by E. $\frac{15}{16}$ E.) 9¾ miles; West Sister Island lighthouse, N. 30° W. (NNW. $\frac{11}{16}$ W.) 17¾ miles.

Work on the new lighthouse on the south point of South Bass Island (Put-in-Bay) will soon begin. A Catawba Island contractor has the contract.

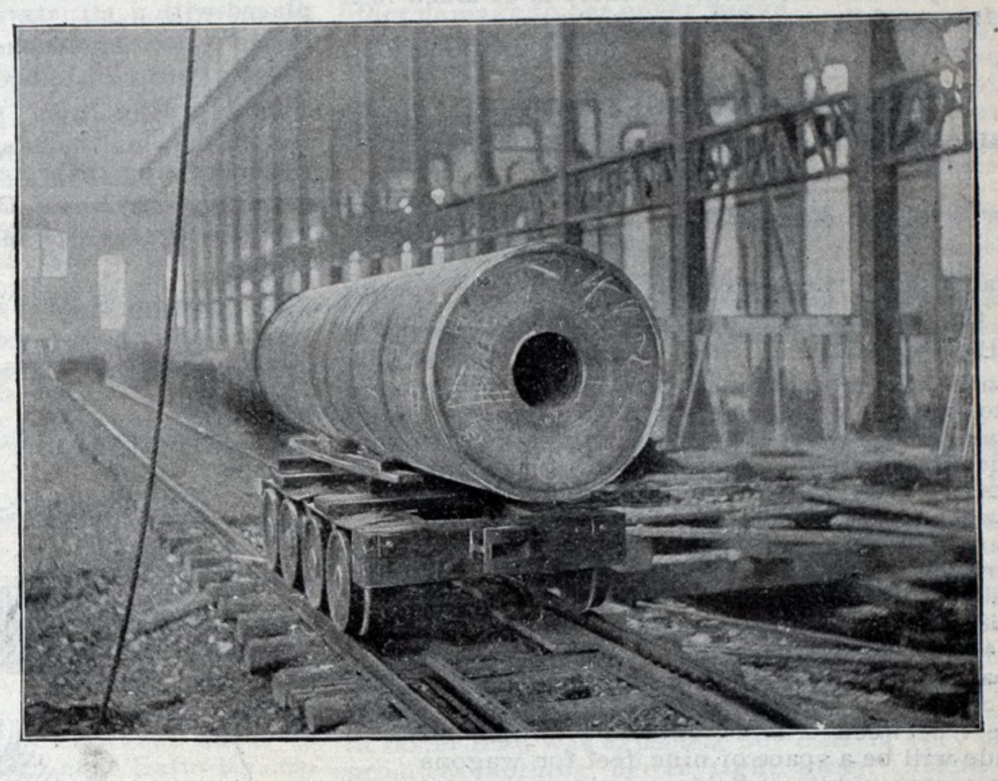
HOLLOW STEEL FORGINGS.

BY MR. H. F. J. PORTER, CHICAGO.

Not much more than twenty years have elapsed since the manufacturers of heavy machinery began to see that the use of steel as a substitute for iron, which was better adapted for the work to be placed upon it than was the original metal, was advisable in machinery, as well in rails, plates, structural shapes, bars and other uses to which it had already been put for ten years previous. Some of these manufacturers, who did not wish to wait until the American forges, which had been working with wrought iron exclusively, should pass through the experimental stage with steel, at once began to place their orders with European forges. Others gave their orders to American forges, and because the work at first turned out was not as satisfactory as they supposed they had reason to expect, concluded that steel forgings were not reliable, and returned to the use of wrought iron, awakening in the minds of many a prejudice which was not entirely overcome until recently, and which still exists in the minds of some persons here and there.



SOLID INGOT OF FLUID COMPRESSED STEEL BEFORE BORING.
Weight 120,000 pounds.



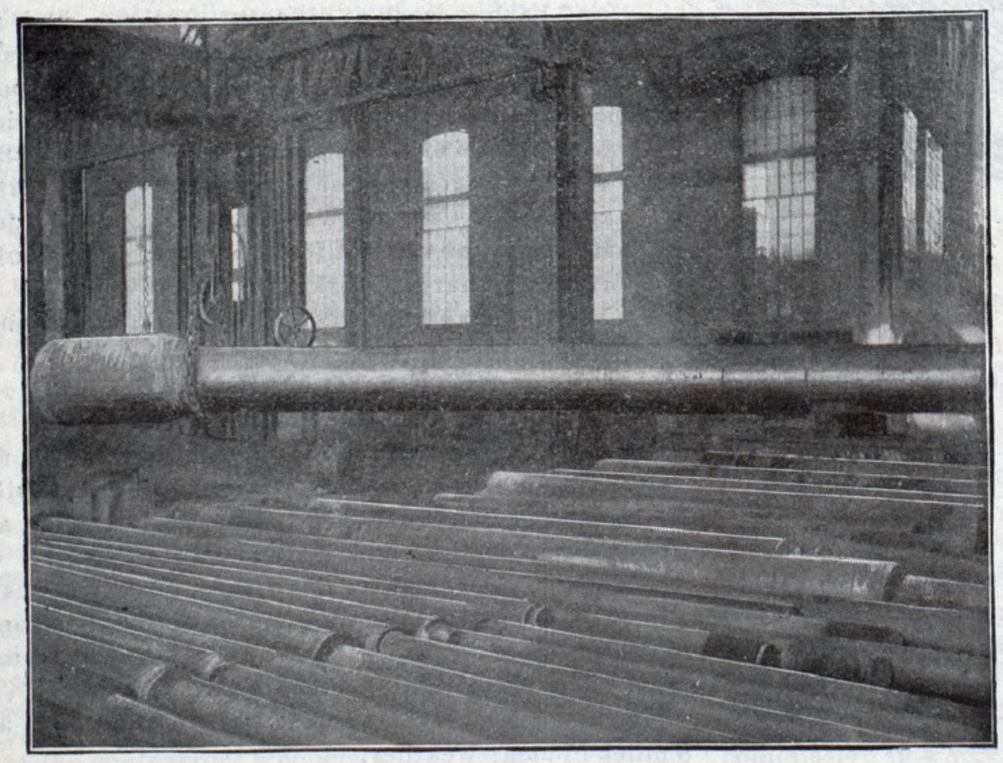
COMPRESSED STEEL INGOT WITH HOLE BORED THROUGH CENTER.
Preparatory to forging.

It was just ten years ago that the Bethlehem Iron Co., which was already well-known in the iron world, showed their appreciation of the conditions then forming by establishing a forging plant especially adapted to the turning out of steel forgings only, and of a capacity to meet any demand that might be made upon it for either the commercial or goverment work of any country. This plant was modeled after the leading establishments respectively of England and France, the company securing not only duplicate parts, as they were required, but also full information as to manufacturing methods and shop practice. This machinery was improved in design whenever possible, and in many cases its capacity was increased; and ever since that time this company has been continually adding special appliances as requirements demanded. The foresight of the management is sufficiently demonstrated in the fact that ever since the erection of the plant it has been kept busy on precisely the lines for which the additional accomodations were constructed, not only in supplying armor plate for the government, but in such work as making shafts, connecting-rods, rings, cylinders, etc., for private corporations; and as soon as they could prepare for it they were called upon to meet a demand for smaller steel forgings, and much work is now being turned out for the respective builders of steam and gas engines, pumps, compressors, mining machinery and miscellaneous tools and parts of special machinery.

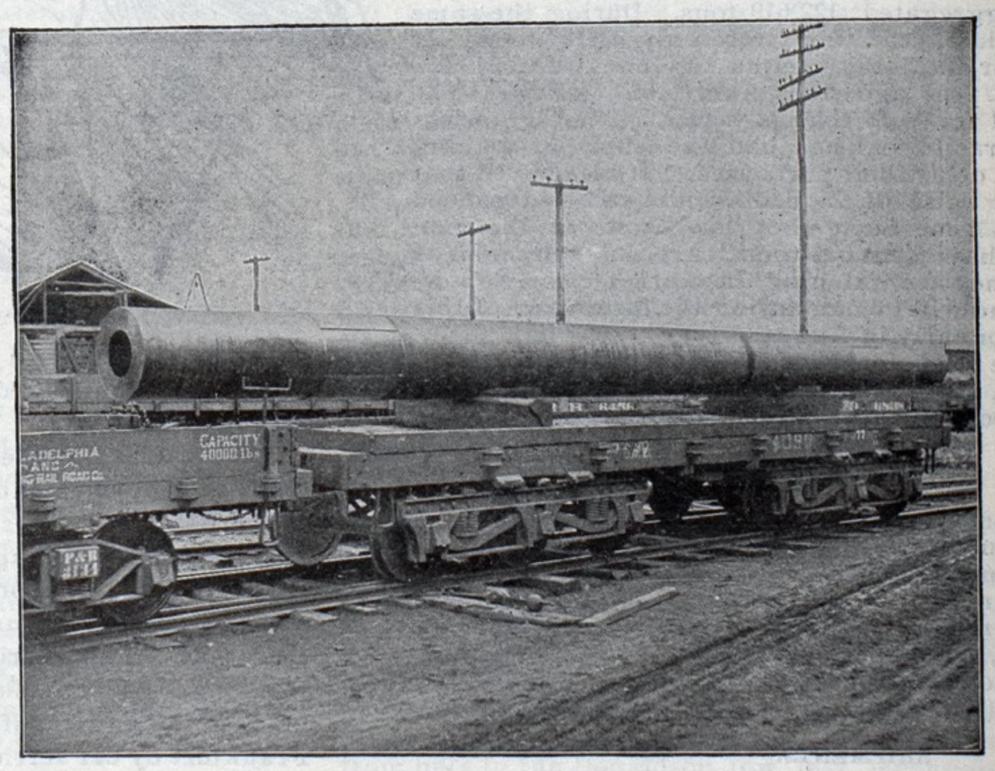
Without entering specifically into the details of the difference between the processes used in forging iron and steel, it may be stated in general terms that with iron advantage is taken of its property of welding. Small pieces, previously heated, are piled one upon the other and pressed together to form the finished piece, much as a clay model or a statue would be built up. On the other hand steel does not possess this quality, and a piece large enough to make the finished forging must be obtained at the start, just as the sculptor must have a block of marble large enough to enable him to chisel out his complete design. Those pieces which are of size sufficient for the forge are called ingots, and are usually circular in cross-section, and varying in diameter and length according to requirements. The greatest care is required in the formation of these ingots, for upon their solidity and composition depends the perfection of the finished forging.

The various ingredients of the steel, having been carefully analyzed to determine in what proportions they should be mixed, are melted in what is called an open-hearth furnace. This is a rectangular basin of from ten to forty tons capacity, heated by gas so regulated in its supply that the temperature of the liquid mixture may be increased, diminished, or held stationary to suit conditions. By thus controlling the heat, some impurities can be entirely burned out, others being allowed to remain in certain proportions. Thus from ten to fifteen hundredths of 1 per cent of carbon makes a grade of steel that differs little in its strength from wrought iron; while an increase in its percentage up to a certain limit, tends to make it stronger, and beyond that to make it hard and brittle. Too much phosphorus tends to make it brittle when cold, and sulphur to make it so brittle when hot that it cannot be forged properly.

By the title of this paper I do not refer to steel forgings that have been forged solid under a hammer or press and subsequently bored, but to those which have been forged hollow. The reasons for adopting this method of producing hollow forgings are many, and the result of long experimenting. In the first place, as the walls of hollow forgings are comparatively thin, the metal must be thoroughly worked, homogeneous throughout, and absolutely without flaw or defect of any kind. For this purpose, therefore, only open-hearth steel is used, and that of a grade that will insure satisfactory working. Its carbon may vary according to the purpose to which the forging will finally be applied; but its phosphorous and sulphur should not exceed 0.04 per cent. In order that the metal should be sufficiently worked to give it strength and toughness, the best practice requires that the ingot should be at least twice the diameter of the finished forging. A 24-inch or 36-inch shaft or roll would, for instance, be worked down from



SHAFT IN PROCESS OF BEING FORGED.



FERRIS WHEEL SHAFT.

a 48-inch or 72-inch ingot. Ingots of these sizes are liable to surface defects, blow holes, piping, and segregation.

Perhaps these terms need some definition. It is evident to all, that in a body of metal of large diameter, the outside will cool very rapidly as compared to the center, and will become solid while the center is still liquid. This cooling is accompanied by rapid contraction, which, being resisted by the weight of metal inside and by friction against the mould, has a tendency to cause surface or skin cracks. Subsequently, as the metal solidifies from the outside inwards, its tendency is to draw on the metal in the centre and upper part to supply shrinkage and thus to form cavities along the central axis or line of last cooling. This defect is known as "piping." Air intrained while pouring the liquid into the mould, and gases generated within the metal in cooling, cause what are known as "blow-holes." There also occurs a concentration of carbon and impurities toward the upper central portion of the ingot during slow cooling from a liquid condition which is called "segregation." To avoid the piping and segregation ingots are made from 25 to 30 per cent longer than would otherwise be necessary, and this part is subsequently cut off and returned to scrap.

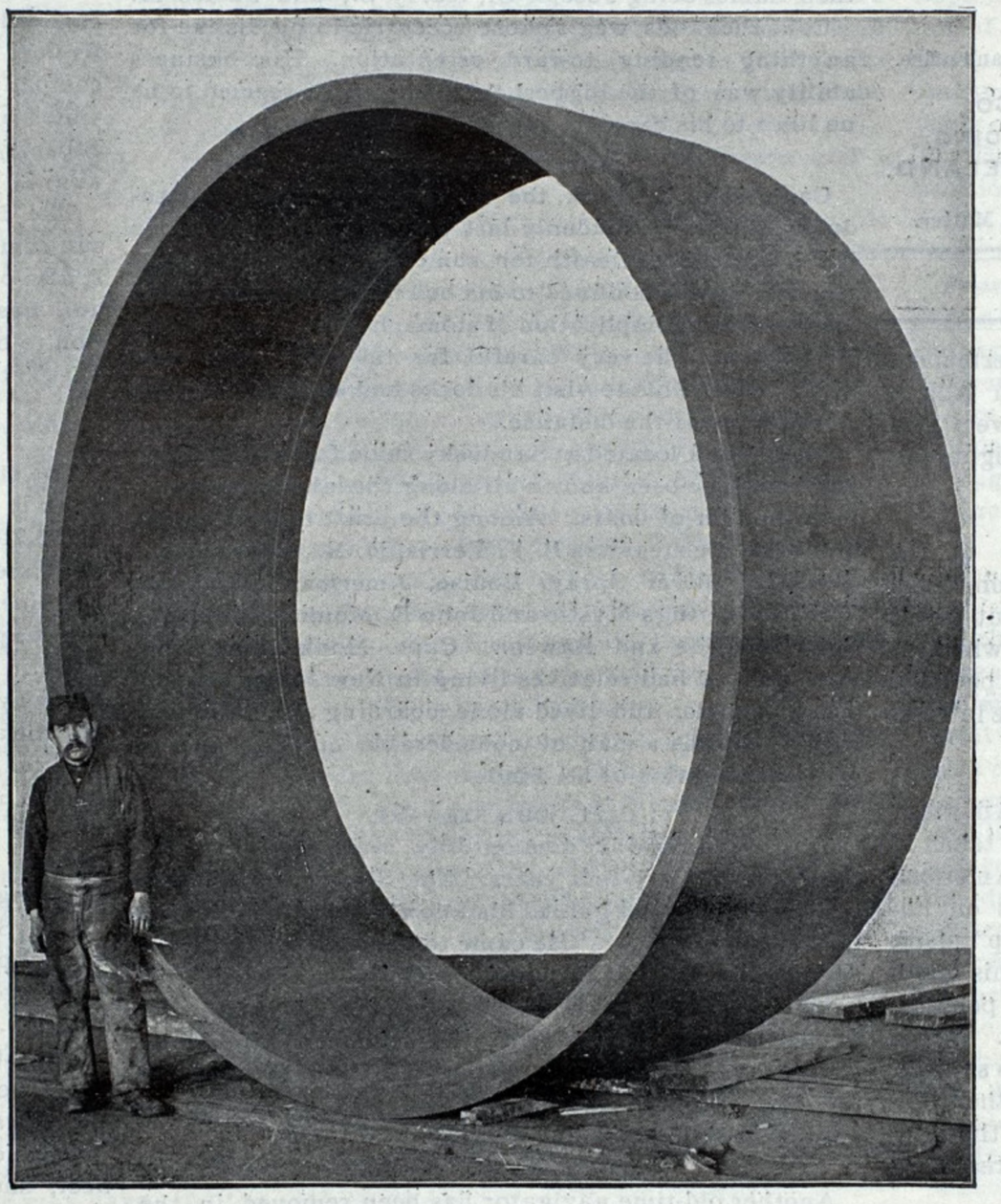
Of all the various methods which have been devised to secure solid and homogeneous ingots, without doubt the most efficient and most to be depended upon is the Whitworth process of fluid compression. This consists in subjecting the metal, in the mould, while fluid, to hydraulic pressure up to 7,000 tons, if necessary. This pressure is continued until the metal is solid throughout, great care being taken to cool the ingot slowly and equally on all sides. After it has been cooled and the upper part has been cut off, a hole nearly the size required in the finished forging is bored through it. This boring out of the center takes away that portion of the ingot where impurities may have concentrated and where there may have been tendency toward piping.

We have now a piece of steel which is as nearly perfect as can be produced, and it is ready for the forging process. First it must be reheated, and as much care has to be taken in this process as was taken in its cooling. The heat must penetrate slowly and uniformly. Its shape, however, is in its favor. The hole in the center removes the danger of cracks starting in that part, owing to the rapid expansion of the exterior, because of its more rapid heating. After being reheated a mandrel of the proper size to fit loosely into the hole is inserted, and the piece is taken to the press, where it is drawn out over the mandrel to the required dimensions.

The pressure applied in shaping a body of steel should be sufficient in amount and of such character as to penetrate into the center and cause flowing throughout the mass. As this flowing of the metal requiresa certain amount of time, the requisite pressure should be maintained throughout a corresponding period. The hydraulic press, therefore, instead of the hammer, is used to work it into shape. Under its action, the forging is slowly operated upon, and the pressure distributes itself evenly throughout the mass, whereas, under the high velocity of impact of the hammer the metal does not have time to flow, thus causing internal strains and possibly cracks. The latter would be fatal defects, for, as steel has not the property of welding, they cannot be remedied.

Besides the undesirability of using the hammer on steel for the above reasons, it is a very difficult matter to make a forging of this character except by use of the hydraulic press. A slow and even pressure is absolutely necessary to draw out the thin cylindrical walls equally and make a shaft that is straight and symmetrical throughout. The varying impact of the hammer works the metal so unevenly that the mandrel is apt to stick fast in the forging. For this type of steel forging, then, it is practically imperative that the press be used, and thus the metal is unavoidably subjected to the best method of treatment. During this process of working down the metal it is probable that the entire piece, or at least the end of it which is being worked upon will have to be re-heated from time to time. Operating on metal which has become too cold would injure it by disturbing the continuity of its flow, and thus establishing lines and planes of weakness.

After the process of shaping to the proposed design has been accomplished, the piece must be subjected to the final treatment of annealing. After all the manipulation to which it has been subjected, together with its frequent partial heatings and irregular coolings, it undoubtedly has strains set up in it. It is to relieve these strains that it must be annealed. This treatment consists in heating the forging slowly in a furnace, and then allowing the latter to cool down slowly with the forging in it. All forgings, whether hollow or not, should be annealed; otherwise there is a certainty of the forging strains developing into weakness after they have been in service, causing them to get out of true, with a possibility of their breaking, particularly if subjected to alternating strains, as in heavily weighted shafts or connecting-rods, and especially piston-rods, which are subjected to changing temperature. Annealing not only relieves these strains, but gives a finer grain and increases toughness.



NICKEL STEEL FIELD RING.
Forged for one of the 5,000 h. p. Niagara Generators.

Annealing generally lowers the elastic limit slightly in well-made forgings, annealed forgings showing it to be about 47 per cent of the ultimate strength. It considerably increases, however, the elongation and contraction. To develop these qualities to their fullest extent in any grade of steel tempering is resorted to. This consists in heating the forgings to a temperature which experience has shown to be right, according to the purpose to which the forging is to be put, and then plunging it into a bath of oil or some other liquid. It is then carefully annealed. This double treatment (which is properly covered by the one word "tempering") tends to harden it, breaks up the crystalline structure due to forging, and modifies the physical properties by increasing the elastic limit and adding toughness. Forgings must be hollow to be tempered successfully, otherwise strains may be introduced which result in weakening instead of strengthening the piece. Authorities on machine design (*vide* Urwin, Seaton et al.) say that solid shafts up to ten inches in diameter may be subjected to a fibre strain of 9,000 pounds in wrought iron, and 12,000 pounds in steel. Above ten inches in diameter, however, iron shafts must not be subjected to more than 8,000 pounds, and steel shafts to not more than 10,000 pounds. The reason assigned is that forges do not possess hammers heavy enough to affect the centers of shafts larger than ten inches in diameter; or if by top steam or long

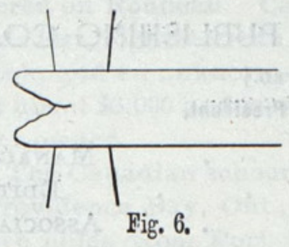


Fig. 6.

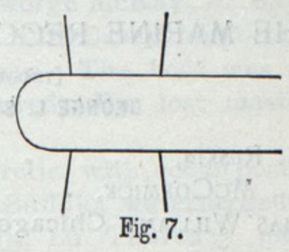


Fig. 7.

drop they are liable to be felt through the whole forging, the effect is produced by velocity of impact rather than by weight of falling mass. This results in damaging the surface, with a tendency to draw it out, leaving the central portion behind, thus producing a tearing strain on the core, producing at times actual cavities. Heavy shafts forged under light hammers show the effects of this treatment in having concave ends (Fig. 6), while shafts forged under sufficiently heavy hammers or under the hydraulic press show bulging ends, the metal in the center, where it is hottest and softest, being pressed out (Fig. 7). Another reason why authorities place a higher safety factor on large shafts, especially of steel, is on account of the liability of steel ingots to have piping and other defects in their centers. With hollow forgings manufactured under the process here describedthese objections are met by taking out the possibly defective center altogether. During the process of forging the mandrel acts as an internal anvil, and thus, even in the largest shafts, the thickness of metal worked upon would be within the limits above mentioned. The use of hydraulic presses having a capacity from 2,000 to 14,000 tons, selected according to the size of the forging under treatment, can leave no doubt in the minds of the most incredulous that the metal has been thoroughly worked. Take, for instance the Ferris wheel shaft, the largest ever made, 32 inches in diameter, with a 16-inch hole through it. The walls of this shaft are only 8 inches thick, between the mandrel and the press, and the metal, therefore, is in better condition, so far as its physical properties are concerned, than in an 8-inch solid shaft, the center or poorer portion of which has not been removed. Under these circumstances, hollow forged shafts are shown to be as strong or stronger than solid shafts of the same diameter. Taking, for example, the shaft above mentioned, we find that when compared with a solid shaft of the same outside diameter, it has lost 25 per cent in weight and has gained 21 per cent in strength.

With the substitution in the trade of steel for wrought iron in engine and miscellaneous forgings, the tendency has naturally been to use a mild or soft steel approaching iron as regards physical qualities and in the ease with which it can be machined. Wrought iron has a low elastic limit, averaging about 20,000 pounds per square inch in large sections, where proper care is taken in its production. Mild steel, when of good quality, is superior to wrought iron in strength, toughness, and homogeniety, and freedom from danger of imperfect welds, and porous spots enclosing slag and scale; but it does not possess the very desirable quality of high elastic strength combined with ductility or toughness in as great a degree as can be obtained without danger in a harder steel, when proper precautions are taken in its manufacture. In other words, in the use of ordinary mild steel only a partial advantage is taken of the most desirable qualities of steel, which are easily within reach. In some instances, where the amount of machine work in finishing is very great, and there is ample margin of safety in the design, as for instance, is often the case with connecting-rods, the use of mild steel may be advisable. Such steel contains

(CONTINUED ON PAGE 10.)

MARINE RECORD

(ESTABLISHED 1878.)

PUBLISHED EVERY THURSDAY BY

THE MARINE RECORD PUBLISHING CO.,

[INCORPORATED.]

GEORGE L. SMITH, President,

C. E. RUSKIN, ... MANAGER.
W. L. MCCORMICK, ... EDITOR.
THOMAS WILLIAMS, Chicago, . . ASSOCIATE.

CLEVELAND, Western Reserve Building, Fourth Floor.

CHICAGO, Royal Insurance Building, Room 308.

SUBSCRIPTION.

One copy, one year, postage paid, . . . $2.00.
One copy, one year, to foreign countries, . $3.00.
Invariably in advance.

ADVERTISING.

Rates given on application.

All communications should be addressed to the Cleveland office.

THE MARINE RECORD PUBLISHING CO.,
FOURTH FLOOR, WESTERN RESERVE BUILDING,
CLEVELAND.

Entered at Cleveland Postoffice as Second-Class Mail Matter.

CLEVELAND, O., JULY 16, 1896.

THERE are indications of a genuine and permanent improvement in the iron and steel trades, which will, it is hoped and believed, be reflected within a very few weeks, in bettering the condition of the lake freight market, which is probably now at its lowest point.

COMMANDER C. D. SIGSBEE, Hydrographer of the Navy Department, has returned to Washington, much pleased with his lake tour, and with nothing but words of praise for all the vessel masters and others whom he met. The good impression was mutual, and the personal visit will accomplish much toward enlivening the interest in the lake work of the Hydrographic Office.

IT is a matter of congratulation for the American shipping interests that in addition to the stand taken in the Republican platform in favor of assisting American shipping by a system of discriminating duties on imports, the Democracy failed to adopt a "free ship" plank which it was attempted to force upon them. This plank was artfully worded, and the party would not, perhaps, have been directly committed by its adoption. But it was deemed best to say nothing at all on the subject. The choice, later on, of Mr. Arthur J. Sewall, the well-known marine shipbuilder, gives assurance that the shipping interests of the country will receive just treatment at the hands of either of the two great parties.

A FEW weeks ago THE RECORD took occasion to disparage the practice of lake-faring men, masters and others, stuffing newspaper men and relating absurdities that these might find their way into print for the amusement of the fraternity. Now it is only fair to say a word of admonition on the other side, and suggest to newspaper men and other landsmen that they should acquaint themselves more fully with the captain's trade before offering gratuitous advice in the way of criticisms. Capt. Alonzo Dwelle, of the steamer Yattaw, was criticised severely at Sandusky in connection with the yachting disaster on July 4. The Yattaw was seen to leave the upturned boats, and went for some distance, and afterwards returning, he lowered a boat from his steamer and proceeded to assist in the work of rescue. Capt. Dwelle was criticised for alleged indecision and dilatoriness of movement in not going directly to the rescue. In other words, fault was because he did not leave the channel and navigate water considerably more shallow than his steamer. He had at once set off to notify a naphtha launch which could do for more work than he could accomplish with his steamer, and all his actions were evidently dictated by a cool head, sound judgment, and careful observation.

OBITUARY.

COL. JAMES PICKANDS.

Not in years have the lake interests lost so prominent a man as Col. James Pickands, senior member of the firm of Pickands, Mather & Co., who died very suddenly and unexpectedly about 4:30 o'clock Monday evening. This firm's extensive interests in vessel, mining, railroad, and dock property are too well-known to need enumeration here.

Col. Pickands was born in Akron, O., Dec. 15, 1839, and lived there until late in the fifties, when he came to Cleveland. He responded to President Lincoln's first call for troops and won promotion from a non-commissioned office to a colonelcy for gallant conduct during the war. At the close of the rebellion he located at Marquette in the general store business. He remained there until 1882, when he returned to Cleveland and the firm of Pickands, Mather & Co. was organized, the Marquette business being merged into this firm, which has increased its business in fourteen years to an almost phenomenal extent.

Col. Pickands was twice married. Mrs. Pickands, who survives him, is a sister of Hon. M. A Hanna. They had three sons, all of whom are rather young, their names being Joseph O., Harry S., and James M.

Col. Pickands was almost eccentric in his dislike for anything tending toward ostentation. His business ability was of the highest type, and there seemed to be no limit to his capacity for management.

CAPT. JOHN E. MONK.

Capt. John E. Monk, the veteran shipbuilder of Sandusky, died very suddenly last Saturday morning. He had been in poor health for some two years past, and last spring was confined to his bed for some weeks. His disease was a complication of stomach and heart trouble. He has had to be very careful for the past year, and while he was able to visit his docks and shipyard, he had to ride most of the distance.

Capt. Monk located at Sandusky some forty years ago, and has since been known all along the lakes as a prominent builder of boats. Among the craft turned out by him were the steamers B. F. Ferris, R. B. Hayes, Gen. Sherman, Silver Spray, Louise, American Eagle, A. Werble, Jr., tugs Mystic and John E. Monk, and barges Gen. Burnside and Rawson. Capt. Monk came from the east, and had relatives living in New Jersey; but he was a bachelor and lived alone, boarding at a Sandusky hotel. He was a man of considerable culture, and of wide information of all kinds.

CAPT. JOHN STEWART.

Capt. John Stewart died on July 5 at Bayfield, Wisconsin, aged sixty-four years. Capt. Stewart was born in Ireland in 1831 and gained his knowledge of navigation in the English navy. He came to America early in the fifties and settled at Bayfield, which has since been his home. He sailed the lakes for a number of years, and at one time owned and sailed the schooner Algonquin. He served in the late war, being in the navy most of the time. He was well known, and was prominent in politics as well as marine circles.

CAPT. GEORGE M'CARTHY.

Another old-time navigator has been removed in the person of Capt. George McCarthy, who passed away last Wednesday night at his home on Tenth street, Buffalo. Capt. McCarthy was for a long time connected with the Western Transit Co., and figured prominently at that time in the change from sail to steam. He was in the Buffalo custom house for a number of years, but began sailing again some six years ago, having bought an interest in the schooner C. H. Burton. He disposed of this interest only last winter, although he gave up sailing three or four years ago.

CAPT. GEORGE M'KAY.

Capt. George McKay, who was in command of his schooner, the Little Wissahickon, when he was drowned last Thursday night, was about 55 years old and was the son of Capt. William McKay, a pilot in Helmsdale, Southerlandshire, Scotland. He took to the sea in his early youth, and came to America at the age of twenty. He married three years later, and has ever since lived in Bay City. He worked for some thirteen years in the Wheeler shipyard, then owned by H. A. Ballentine & Co. His wife and three sons survive him.

Capt. McKay was highly esteemed wherever known. He was a devotedly religious man, and was a member of the Order of Chosen Friends.

MINNESOTA IRON CO.

At the annual meeting of the Minnesota Iron Co., the following directors, was selected: H. H. Porter, Marshall Field, Jay C. Morse, D. H. Bacon, Charlemagne Tower, R. P. Flower, H. R. Bishop, Benjamin Brewster, D. O. Mills, H. M. Flagler, Henry Seibert, J. L. Greatsinger and C. P. Coffin. D. H. Bacon was re-elected president; Henry Seibert, vice-president; A. J. Patterson, treasurer and assistant secretary, and C. P. Coffin, secretary and assistant treasurer.

The fiscal year of the Minnesota Iron Co. now ends December 31. The total production of all the company's mines last year was 2,003,767 tons, as compared with 1,309,575 tons in 1894 and 830,649 tons in 1893. The company owns absolutely the Minnesota, Auburn, Canton, Fayal, and Norman mines, and the controlling interest in the Chandler. The total production of each of these mines is as follows: Minnesota, operated twelve years, 4,720,364 tons; Chandler, eight years, 3,321,462; Canton, three years, 597,289; Auburn, two years, 485,180; Norman, two years, 132,391; Fayal, one year, 136,601.

This company was organized under the laws of Minnesota in 1882. It owns all the capital stock of the Duluth & Iron Range Railroad, $500,000. This road has 173.65 miles of main track, 3.88 miles of double track, 56½ miles of siding, complete rolling stock equipment, five ore docks and one merchandise dock. The railroad company has a grant from the state of 610,000 acres of which half has already been deeded. The rail and dock capacity of the road is equal to handling 3,500,000 tons annually.

The Minnesota Iron Co. owns in fee and through its sub-companies 41,550 acres, and has under lease 3,150. It also owns eight steel steamers and four steel consorts, and has one steamer and one consort under construction to be finished in August. The last large sale was 400,000 tons to the Carnegie Steel Co., Limited.

MORE RECORDS.

The steamship Lagonda did not get full credit for her work in last week's RECORD. Her load as then given was 3,218 tons, which, while very creditable, considering the dimensions of the ship, was something of a disappointment. It could only be accounted for by the fact that Capt. John Mitchell, her managing owner, was on board. Now it is learned that a mistake was made in her way bills, and the boat has since received a check for the amount of her cargo with which she was not credited, the real load being 3,352 gross tons. The Lagonda has also been making some remarkable time. She left Cleveland on her second trip Friday night, went to Ashland, loaded, and returned to Cleveland, reaching port early Wednesday morning.

The Sir Henry Bessemer, sister ship to the Coralia, has eclipsed all records by bringing down from Ashland 4,000 gross tons of iron ore. The cargo was loaded Monday.

The steamer Emily P. Weed was loaded with 2,500 tons of coal at the Cuddy-Mullen dock, Cleveland, in six hours.

The steamer Cort and consort Russell, of the Bessemer fleet, show a round trip record to Lake Superior and return in 7 days and 15 minutes.

OPENING OF THE NEW LOCK.

It is thought that locking through the American lock at Sault Ste. Marie will begin during the first few days in August. The dredging in the approaches is in pace with the work on the lock proper. The machinery is receiving its finishing touches, and some of it has been "turned over," with eminently satisfactory results. The power-house and office building will not be finished until after the close of the season, but this will in no way interfere with the operation of the lock.

The three Westinghouse pumps which will be used to empty the chamber in case of accident, were turned over a few minutes Thursday night and worked to perfection. The pumps can be started at any time within an hour when there is only cold water in the boilers.

The Penberthy Injector Co., of Detroit, has set a day for the previously announced celebration of the manufacture and sale of its 100,000th injector. The celebration will consist of an outing trip to St. Clair Flats, on Saturday, the 25th, to be enjoyed by their employes and other invited guests. The program will be more fully announced next week.

SHIP BUILDING AND REPAIRS.

SOME NEW WORK IN SIGHT.

Steel men state that they have been asked for figures on shipbuilding material, but not in a way that indicates any immediate contracting. Officials of the American Steel Barge Co. announce that the directors will very soon decide to build a steamer and consort which shall exceed in size any whalebacks ever yet built and possibly prove to be the largest carriers on the lakes. These will not be hurried however, and will not be laid down until the two Rockefeller boats are well away from the yard. The desire of the company is evidently to keep its working organization in line. The subject of a second dry-dock is also being again seriously considered with great likelihood of its being carried through.

The two whaleback barges 201 and 202, which were brought from the Atlantic ocean to the lakes recently, will be enlarged the coming winter to the extent of 1.000 tons each. The present carrying capacity of each is 1,500 tons, and they will be enlarged to 2,500 tons each. The work will, of course, be done at West Superior.

The daily newspapers announced last week that President and General Manager J. W. Boyton, of the Central Michigan and Michigan & Ohio Belt Line railroads terminating at Grand Haven, Mich., and Fostoria, O., have closed a contract with the Craig Ship Building Co. for two car ferry steamers of wood, with a capacity for 34 cars, to ply between Grand Haven and Milwaukee. It seems that this contract has not been formally closed, but that arrangements will probably be completed this week with the Craigs which will result in the construction of one car ferry of the above capacity, with another to follow when the first is complete.

President Boynton writes THE RECORD that the car ferries will operate in connection with the two roads above named, which, with their connections, extend through Grand Rapids, Battle Creek, Coldwater, and Camden, Mich., and through Napoleon, Fostoria, Columbus and the coal fields of Southern Ohio and West Virginia. The prime object seems to be largely to carry coal to the Northwest, but an extensive traffic of a general nature can doubtless be worked up.

This system of transportation is fast growing very popular, and there are on foot one or two other projects for other lakes beside Lake Michigan, particulars of which THE RECORD is not yet at liberty to make public.

A strike still exists at Wheeler & Co.'s shipyard, West Bay City, but the company continues at work with new men it has engaged. Nothing is as yet very nearly ready to launch.

The Globe Iron Works Co. had expected to be ready to launch the second ship on its contract with the Bessemer Steamship Co. next Saturday, but it is hardly likely that she will be launched until the 25th inst. She will be christened the Sir William Siemens, and will be the third steamer of the new fleet to be floated.

Our Buffalo correspondentst ates that the Union Steamboat Co.'s new boat Ramapo is to be finished up as fast as possible, all outside ideas to the contrary notwithstanding. For some reason the notion has gone out that no haste was making on it, and there may have been some reason for the report to that effect that comes in a Detroit paper, but orders have now been given to rush her through. She might be launched in a week or so, but the plan is to finish her first. The two excursion boats, one to be built for Chautauqua Lake and the other for Hemlock Lake, are not to be carried forward this season, if at all.

From the bills of sale recorded at Milwaukee it appears that the steel tug Fischer and two car ferries recently completed at Toledo for the Lake Michigan Transportation Co. represent an investment of $156,000. The tug cost $60,000 and the ferries $48,000 each.

The contract for the hull of the Milwaukee fireboat is said to lie between Reiboldt, Wolter & Co., of Sturgeon Bay, and E. W. Heath & Co., of Benton Harbor.

LAUNCH OF THE JOHN ERICSSON.

The whaleback steamer John Ericsson, the second of the new fleet of the Bessemer Steamship Co., was placed in the water at the American Steel Barge Co.'s yard, West Superior, last Saturday afternoon. She is 404 feet long by 48 feet beam and 27 feet moulded depth. She is expected to carry 4,000 gross tons in 14½ feet. Her engines are of the triplex type, 25, 40 and 68 by 42 inches, and her boilers are three in number, Scotch type, 13 x 13 feet. Engines and boilers were furnished by the Cleveland Ship Building Co. She has a complete outfit of auxiliary machinery.

The Ericsson is built on the cellular system. Her water bottom is 66 inches deep between the engine and collision bulkheads, and is divided by center keelsons and solid floors into eight compartments for water ballast. The hold is divided into four compartments by three screen bulkheads, extending to the spar deck. The engines are in the extreme after end, and there are twelve cargo hatches, spaced 24 feet between centers. There is a forecastle deck and a steel deck-house forward, and a steel deck-house aft. The dining room and galley are on the main deck aft.

GENERAL REPAIR WORK.

CHICAGO.—At the Chicago Ship Building Co.'s shipyard the steamer Brazil is in dry-dock for several new steel plates on her bottom; the schooner Sophia J. Luff was in dock for bottom calking, steel plates on keelson, and some new stanchions, stringers and rail; the barge Marcia received some repairs.

At Miller Bros.' shipyard the tug A. G. Van Schaick was in dry-dock to have leaks stopped and repairs to her stern bearings. The tug Luther Loomis was in and had a slab of wood taken out from between her wheel and shoe. The canal boat First National was in for recalking her bottom. The schooner N. H. Ferry received some new plank on her centerboard.

The schooner Presto is receiving a new cabin and a general overhauling.

At the Independent Tug Line's floating dry-dock the schooner Four Brothers was on for repairs and recalking; the tug Ruby for general repairs; the tug D. P. Hall for repairs to her stern bearings and some calking.

STURGEON BAY.—Reiboldt, Wolter & Co. have nearly completed the scow they are building for their own use. They are putting up a shed for their boiler, engine and a beveling machine. The schooner R. Kanters finished her repairs, and the schooner William Aldrich has been thoroughly recalked below the water line.

SANDUSKY.—Before the schooner J. R. Pelton went ashore below Lorain, her owners had arranged with Capt. David Dessault, to rebuild the vessel next winter. It is probable that the improvments then contemplated will begin at once, as she is released.

REPAIR NOTES.

The Mingoe got a new foremast at Toledo. The Periwinkle has been having some calking done.

The Colonial got a new wheel at Milwaukee this week.

The C. A. Eddy is getting machinery repairs at Duluth, and the Northern King at Portage.

The Parks Foster had three broken plates and frames temporarily repaired at the Ship Owners' dry-dock, Cleveland.

The Topeka has been getting a new wheel at Buffalo.

The schooner Wadena broke off part of her jibboom at Ashtabula last week.

NAVIGATION BUREAU'S REPORT.

The report of the Navigation Bureau shows that during the year ended June 30, 1896, 709 vessels of 204,000 gross tons were built in the United States and officially numbered by the Bureau of Navigation, compared with 682 vessels of 133,000 tons for last year, an increase of 71,000 tons. Steam vessels built numbered 322 of 135,000 tons, compared with 283 of 75,700 tons for the previous year. Steel as chief material of construction has increased to 106,900 tons from 47,700 tons for the previous year. Nearly three-fourths of the steel tonnage was built on the Great Lakes. The tonnage built and numbered on the Great Lakes was 104 vessels of 92,000 tons, compared with 93 vessels of 38,000 tons for the previous year, which indicates also the rapid increase in size of the vessels of the lake fleet.

NEWLY ENROLLED TONNAGE.

Following is a list of lake vessels to which official numbers and signal letters have been assigned by the Commissioner of Navigation, for the week ending July 4:

Official No.	Rig.	Name.	TONNAGE. Gross.	Net.	Where Built	Home Port
141,436	St. y.	Loma	10.43	8.72	Chicago	Chicago
20,612	St. s.	Queen City	3,979.68	3 198.15	Cleveland	Duluth
161,771	St. s.	Vailma	15.28	7.64	Ogdensburg	Ogdensburg

WRECKS AND WRECKING.

Two fatal losses occurred on Lake Erie during the blow of last Thursday. One vessel was the barge Little Wissahickon, in tow of the steamer Donaldson, which had also the barges Lester, Active, J. L. Ketchum, and A. W. Wright. All had coal from Buffalo to Bay City. The Little Wissahickon got to leaking to such an extent that her pumps would not keep her free, and she foundered off Rondeau. Capt. George McKay, of Bay City, was lost, together with Mrs. Kate Casey, of Toronto, the cook, and an unknown seaman. The boat was valued at about $3,000 and was insured. Her lost master was her owner.

The Canadian schooner Arctic, with cedar posts from Providence Bay, Ont, for Buffalo, waterlogged about five miles from Port Rowan, on Thursday morning. Two sailors who tried to reach shore in the yawl were drowned. The life-saving crew of Port Rowan took off the others, the captain, three men and two women. The lost men were Robert Pigeon, of Toronto, and Dugald Buie, of Wiarton.

The steamer Samoa and consort Celtic, with grain consigned to Prescott, Ont., got on a rock shoal near Brockville, Ont., Tuesday. The Samoa knocked a big hole in her bottom, and went down in Watrus Bay while Capt. Stewart was trying to get her ashore. The tow line of the Celtic was dropped, but she drifted on the shoal, and while resting there is thought not to be badly damaged. The Samoa is in 18 feet of water, her decks being out of water. Both vessels and cargoes are insured. The Donnelly Salvage & Wrecking Co., has sent an expedition to the Samoa. The Samoa is owned by Brown & Co., of Buffalo, and the Celtic by G. K. Jackson of Bay City.

Four men of Marinette, Wis., went out on a scow in Green Bay, and were probably lost on Peshtigo Reef during a blow Sunday. They were Joseph and William Barber and two others unknown.

Fire broke out in the pilothouse of the tug J. V. O'Brien at Bay City, Thurday, July 2, created $1,200 damage, fully covered by insurance. The tug is owned by the Holland-Emery Lumber Co., of Tawas, Mich.

The secret expedition to the Pewabic from Milwaukee, with a deep sea diving apparatus, has been abandoned and the structure lies in a scrap iron pile at Pittsburg. It was lowered 200 feet into Lake Michigan as a test, and was drawn up crushed out of recognition. The material was phosphor bronze, ⅝-inch thick. The plates were cut with a flange, by which they were riveted together. Inside the plates were ribs an inch thick and two inches wide. The windows were three inches square and one inch thick. The pressure exerted on the diving apparatus at 200 feet was 86.8 pounds per square inch, a total pressure on all sides of 1,361.7 tons. A friend of THE RECORD in Cleveland recently informed us that he had inspected the Milwaukee machine and that it was not built according to well-known mechanical laws and would surely collapse when put into use.

Late reports from the S. F. Hodge state that she is in 500 feet of water and cannot be raised. Her wire cargo is now reported to have been badly damaged by the fire before the Hodge sank.

The schooner Col. Ellsworth, which went ashore last fall, was released last Thursday.

The wrecking steamer Johnston has located the wreck of the barge John Shaw after a month's search. The Shaw was lost from the tow of the John F. Eddy in the fall of 1894 off Greenbush.

The Supervising Inspector of the St. Louis district reports on the results of the tornado of May 27 as follows: Boats totally destroyed, 9, valued at $171,500; boats damaged, 23, the damage being $219,150; total loss, $390,650. The report does not include damage to barges and wharf boats, as it embraces only steam craft. The report states that six lives were lost.

The steamer Mark Hopkins, which was sunk September 23 by collision with the Vanderbilt, was raised from her resting place in Mud Lake, St. Mary's River, Tuesday morning by Wrecker McMorran. He is to have $11,500 or the vessel, at the option of the underwriters. The wrecking work has occupied some months, and the profits will not be very large.

The drawbridge at Sturgeon Bay canal was damaged for forty feet Saturday night by W. & M. barge No. 4.

HOLLOW STEEL FORGINGS.

(CONTINUED FROM PAGE 7.)

about 0.20 to 0.25 per cent of carbon, and can be guaranteed to show, in specimens four diameters in length cut from a full-sized prolongation of forgings or from representaive pieces, a tensile strength of not less than 57,000 pounds per square inch, and an elastic limit of not less than 27,000 pounds per square inch, with an average elongation of 25 per cent. For the general run of engine forgings, however, a harder steel should be used, in which a tensile strength of about 75,000 pounds and an elastic limit of about 35,000 pounds per square inch can be obtained, together with an average elongation of 20 per cent in four diameters.

When proper precautions are used, forgings can be made with perfect safety of a still higher grade of steel, and this is especially recommended for crank and crosshead pins, and for all parts subjected to severe alternating strains and to wearing action. In this grade of steel a tensile strength of about 85,000 pounds and an elastic limit of about 40,000 pounds per square inch can be obtained, with an elongation of 15 per cent in four diameters. If steel forgings are tempered they can be be furnished with a tensile strength of 85,000 to 90,000 pounds and an elastic limit of 45,000 to 55,000 pounds per square inch, and an elongation of 15 to 20 per cent in four diameters. By introducing about 3 per cent of nickel into the composition of steel a finely granular or amorphous condition is obtained in forgings, and the the very highest quality of steel is obtained. By the combination of hollow forging and tempering this nickel steel a result is obtained excelling all others known in elastic strength and toughness.

As an example can be mentioned the shafts of the U. S. S. Brooklyn, with 17 inches outside diameter, 11 inches inside diameter, and 39 feet in length, weighing 19,112 ponnds. These showed, on specimens cut from full-sized prolongations, a tensile strength of 94,245 pounds, and an elastic limit of 60,775 pounds per square inch, an elongation of 25.5 per cent and a contraction of area of 60.58 per cent.

Fluid-compressed steel of 0.40 to 0.45 per cent carbon, and more especially nickel steel, oil-tempered, is markedly adaptable for piston-rods of rock-drills, mining machines and hydraulic presses, for drop-hammer rods, stamp stems, cam shafts and similar pieces that are subjected to stress alternating between tension and compression or of either kind frequently repeated. By substituting steel of this grade, which would have an elastic limit of about 60,000 pounds per square inch, for wrought iron or mild steel, which is generally used for the purpose, and by so proportioning the cross-section that the metal is not strained beyond one-half the elastic limit, crystallization from shock or vibration does not occur and their life is prolonged indefinitely.

The ability to produce forgings of this hollow variety has led to their adoption in many places where castings of iron and steel have been previously used. The substitution has resulted in considerably lightening the dimensions of such pieces, and also the parts in which they rest or move. Undoubtedly the best type of hollow

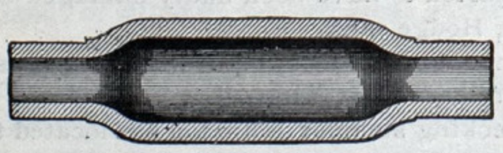


FIG. 8.

forging, and one which is gradually being introduced both for shafts and rolls is where the walls are the same thickness throughout, the outside and inside diameter varying together, both being greatest in the center, where the strength is required (Fig 8), and smallest at the bearings. Such a shaft is built on the principle of a girder, and offers the greatest strength for the least amount of metal.

FOR SALE AT THE RECORD OFFICE.

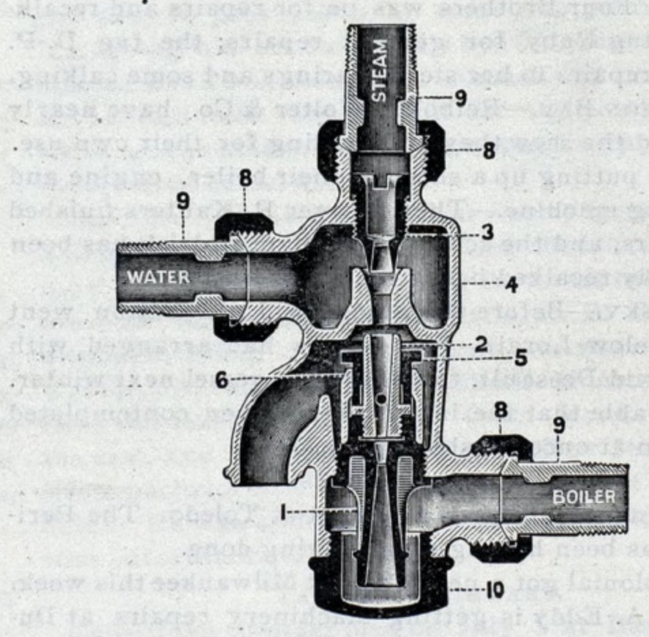
We have been familiar with Beeson's Marine Directory since its first issue and notice the constant improvement, both in style of book and scope of information. We consider it one of the most comprehensive and elegant publications we receive.—Andrew J. Morse & Son, Mfrs. of Diving Apparatus.

When will we receive the 1896 issue of Beeson's Marine Directory? You will have to get this book out earlier in the season. We have needed it very much several times.—The Cleveland Cliffs Iron Co., May 1, 1896.

We desire to compliment you again, Mr. Beeson, on your success in compiling such a tasty and interesting directory.—The Garlock Packing Co., Palmyra, N. Y.

SELLERS' RESTARTING INJECTOR.

The accompanying illustration gives a sectional view of the new automatic restarting injector which has lately been brought out by Wm. Sellers & Co., incorporated, in Philadelphia, and for which Jenkins Bros., No. 71 John street, New York, have been appointed selling agents. This injector was designed for use on stationary and portable boilers, traction and hoisting engines, tug boats, etc. The house of Wm. Sellers & Co., incorporated, has a wide reputation as makers of high class injectors for locomotive and other service. The injectors made by this house are the most perfect boiler feeders known, and are the result of many years of careful and scientific study and experiment to determine the proportion and shapes that will give the widest possible range, with the most economical consumption of steam and at the same time be perfectly reliable. Their system of manufacture is such that the pipe sizes and proportions, having once been determined, they are strictly maintained by having parts made to a perfect system of gauges; so that they are thoroughly interchangeable, and although this injector may have been in service until quite well worn, a new tube or part can be furnished that will fit perfectly and give exactly the same results as the original. This new restarting injector is made in the same careful manner, is thoroughly



automatic in every respect, and has been designed with a view of having as few parts as possible. There are no levers; no fittings except ordinary globe valves are required. It is very easily repaired, only a scerw driver and a monkey wrench being required to take it apart when necessary to clean or renew parts. In designing this injector particular care has been exercised to obtain a wide range, to enable it to work hot water and to get maximum lift. It will be noticed that there is no valve or other obstruction in the overflow, so that when the injector is out of service, if the steam supply valve should leak, there is no danger of heating the water in the service pipe to a very high temperature. Fourteen sizes are made, covering a range of horse power from 2 to 400. This injector is meeting with great favor from steam users and is, the agents think, destined to become the leading injector in the market. The agents will send an interesting descriptive booklet to inquirers.

BABBITT PATENT IMPROVED ANCHOR.

The following letter in regard to the Babbitt improved stockless anchors, of which the American Ship Windlass Co., Providence, R. I., are the sole manufacturers, shows their just popularity:

Mr. Clinton Sproat, Dear Sir: Will you ship me as soon as possible one of your 20-pound Babbitt anchors? I have a 30-pounder which held me in an exposed place at Sakonnet through the gales of three years ago, but it is rather heavy for every-day use. It has the most hold for its weight and is the most convenient of anything I have ever seen. Ship by freight care of W. B. Burrington, Barrington, R. I. Yours truly,

S. R. BURLEIGH.

Providence, R. I., June 5, 1896.

NAPHTHA LAUNCHES FOR THE NEW YORK POLICE.

The harbor service of the New York police department will be greatly improved by the addition of four serviceable naphtha launches, which will be used instead of the rowboats heretofore employed. Before selecting these launches the department carefully investigated a number of different motors, among them being the Daimler, the Alco, the Globe, the Hirsch and others, and finally decided upon the launches and motors as manufactured by the Gas Engine & Power Co., at Morris Heights on the Harlem, as the best possible results as to speed, safety, economy, durability, cleanliness and comfort were produced.

The launches ordered by the department will be 30 feet long, 6 feet 6 inches beam and about 2 feet 6 inches draft. The frames will be of selected seasoned white oak. Hackmatac stem. The sternpost dovetailed into keel, and the counter dovetailed into the stern post and thoroughly fastened. Planking of selected cedar, copper fastened. A standing roof top of wood fitted with glass windows arranged forward, which can be lowered in fine weather and raised in wet weather for protection to the men. Cushions, steering wheel, lamps, boat hooks, anchors, etc., will be furnished. In fact, the launches will be complete in every particular, and built strong and substantial and thoroughly adapted for hard service, which they will be subjected to by the harbor police. These launches will be completed and ready for the department's service by the latter part of July, 1896.

THE LIBRARY TABLE.

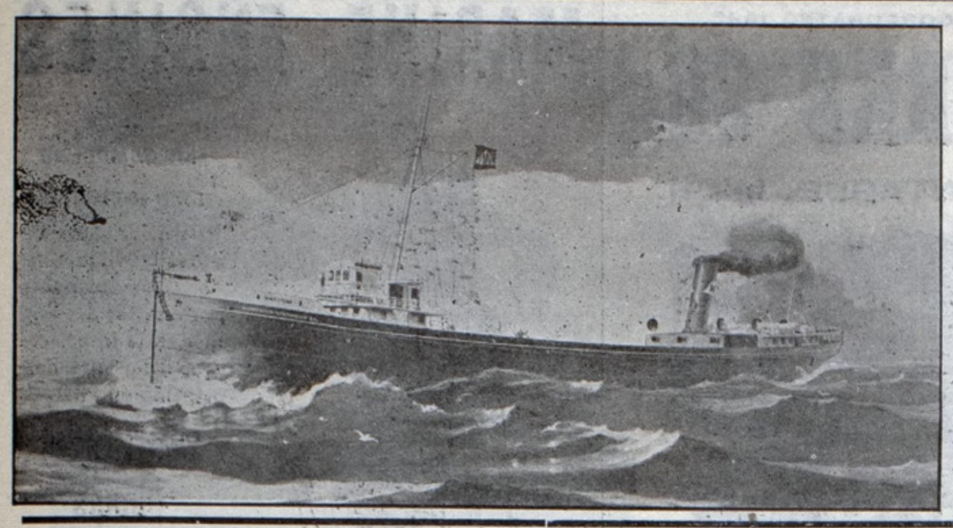
Beginning with 1889 Scribner's Magazine has annually published a fiction number that has been remarkable for the number of famous stories that have first made their appearance in it. The August issue of this year will fully sustain this reputation. There will be six short stories, a comedietta, and several popular illustrated articles.

We have just received from the J. B. Lippincott Co., of Philadelphia, another of the Charles Griffin & Co.'s nautical series, in binding similar to that of "Know Your Own Ship." The title is "Latitude and Longitude—How to Find Them," and the author is Mr. W. J. Millar, C. E., secretary of the Institution of Engineers and Shipbuilders in Scotland, and author of "An Introduction to the Differential and Integral Calculus." The work is aimed and well adapted to present to the student, in a simple manner, some of those problems that relate to the finding of position by means of altitudes of the sun or of stars. It is well put together, with an explanation of forms of mathematical expression which will render the main truths of the work accessible to those who have not studied higher mathematics. The price of the book is $1.

VISIBLE SUPPLY OF GRAIN.

As compiled for THE MARINE RECORD by George F. Stone, Secretary Chicago Board of Trade, July 11, 1896:

CITIES WHERE STORED.	WHEAT. Bushels.	CORN. Bushels.	OATS, Bushels.	RYE, Bushels.	BARLEY Bushels.
Albany	.....	20,000	75,000	.....	.....
Baltimore	430,000	350,000	452,000	17,000	.....
Boston	726,000	238 000	152 000	.....	.....
Buffalo	1,014,000	363,000	287,000	132,000	234 000
" afloat	.....	.....	.....	.....	.....
Chicago	13,462,000	4,948,000	1,222,000	281,000	15,000
" afloat	.....	.....	.....	.....	.....
Cincinnati	4,000	5 000	15,000	1 000	.....
Detroit	116,000	11,000	11,000	6,000	.....
" afloat	.....	.....	.....	.....	.....
Duluth and Superior	7,499,000	25,000	256,000	323,000	68,000
" " afloat	.....	.....	.....	.....	.....
Indianapolis	81,000	15,000	1,000	.....	.....
Kansas City	903,000	28,000	7,000	5.000	.....
Milwaukee	404,000	2,000	1 000	369 000	26,000
" afloat	.....	.....	.....	.....	.....
Minneapolis	16 133 000	22 000	320 000	77 000	40,000
Montreal	371,000	24,000	298,000	6 000	36,000
New York	2,291,000	464 000	1,741,000	39,000	53,000
" afloat	24 000	24,000	24,000	.....	.....
Oswego	46,000	5 000	.....	.....	49,000
Peoria	45,000	40,000	208,000	3 000	.....
Philadelphia	209,000	154 000	148 000	.....	.....
St. Louis	452,000	120,000	29,000	2 000	.....
" afloat	.....	140,000	.....	.....	.....
Toledo	301,000	37,000	16,000	55,000	.....
" afloat	.....	.....	.....	.....	.....
Toronto	175,000	1,000	71,000	.....	21,000
On Canal	520,000	199,000	955,000	84,000	99,000
On Lakes	1,852,000	1,912,000	1,906,000	55,000	127,000
On Mississippi	162,000	11,000	33,000	.....	.....
Grand Total	47,220,000	9,188,000	8,228,000	1,455,000	768,000
Corresponding date 1895	41,237,000	6,882 000	5,632 000	132,000	51,000

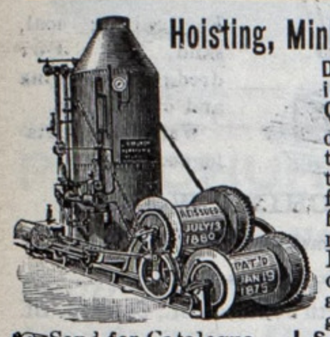


GRAHAM'S

Rapid Fueling Docks, Detroit River, foot 21st Street.

No interference from Passenger or Car Ferry Lines.
Full supply of BEST STEAM COAL always on hand.
Wide stretch of river and plenty of water at dock. POCKETS and CHUTES arranged for various types of vessels, allowing QUICK DISPATCH day or night.

JAMES GRAHAM, DETROIT.



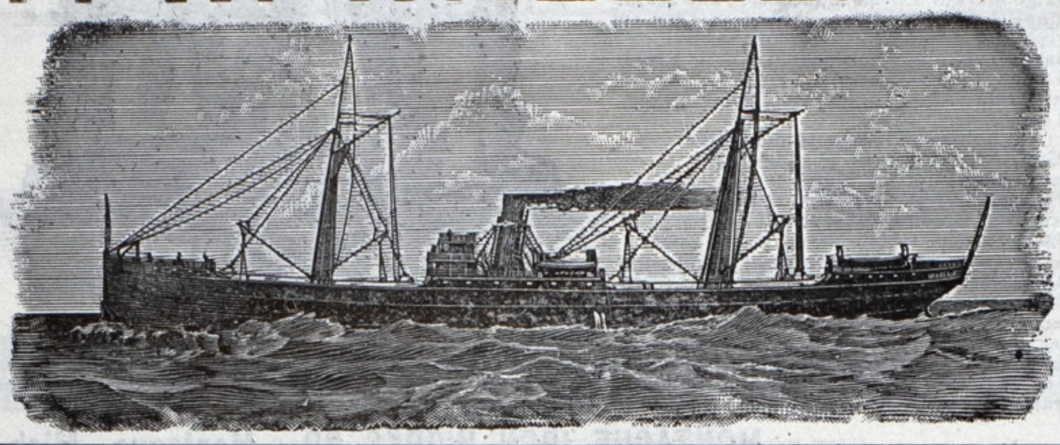
Hoisting, Mining Bridge Erecting

Dock Building, Pile Driving, Coal Hoisting and Quarry Engines.

of any power, sugar cane transferring engines, transferring machines for depositing cane from car to carrier, with my improved Patent Friction Drums, with or without Boilers. Any amount of reference given. Established 1870.

Send for Catalogue. J. S. MUNDY, Newark, N. J.
1741 Market St., Philadelphia, Pa.
22 Light St., Baltimore, Md.
117 Water St., Pittsburgh, Pa.
249 South Jefferson St., Chicago, Ill.
715 North Second St., St. Louis, Mo.
39 Magazine St., New Orleans, La.
34 Fremont St., San Francisco, Cal.
85 Front St., Portland, Oregon.
218 Congress St., Boston, Mass.

F. W. WHEELER & COMPANY.,



BUILDERS OF ALL KINDS OF

IRON, STEEL AND WOODEN SHIPS,

FOR LAKE OR OCEAN SERVICE.

West Bay City, Mich.

F. W. WHEELER, Prest. E. T. CARRINGTON, V.-Prest
C. W. STIVER, Secretary & Treasurer.

FRONTIER IRON WORKS,

MARINE ENGINES,

DETROIT, MICH.

INCORPORATED 1794.

Insurance Company of North America.

CAPITAL, PAID UP IN CASH, - $3,000,000.00.
ASSETS, - - - - 9,487,673.53.

CHARLES PLATT, President. WILLIAM A. PLATT, Vice President.
EUGENE L. ELLISON, 2d Vice President. GREVILLE E. FRYER, Sec'y and Treas.
JOHN H. ATWOOD, Assistant Secretary.

Lake Marine Department.

GEORGE L. McCURDY, MANAGER, CHICAGO, ILL.

MARINE AND INLAND INSURANCE.

Atlantic Mutual Insurance Co.,

Organized 1842. Office 51 Wall Street, NEW YORK.

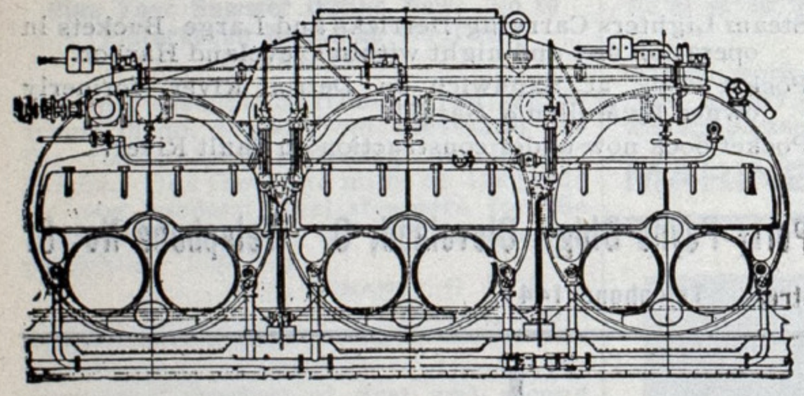
Insures against Marine and Inland Transportation Risks and Issues Policies making Loss Payable in England.

Assets over $10,000,000 for the Security or its Policies.

The profits of the Company revert to the assured, and are divided annually upon the premiums terminated during the year; thereby reducing the cost of insurance. For such dividends, certificates are issued bearing interest until ordered to be redeemed, in accordance with the charter.

J. D. JONES, Pres. W. H. H. MOORE, Vice Pres. A. A. RAVEN, 2d Vice Pres. J. H. CHAPMAN, Sec.

LAKE ERIE BOILER WORKS



The best equipped plant in America for the manufacture of

MODERN MARINE BOILERS.

BUFFALO, N. Y.

..Up to Date

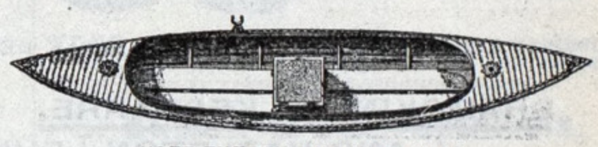
IS A GOOD POINT.

MULLINS' METAL BOATS

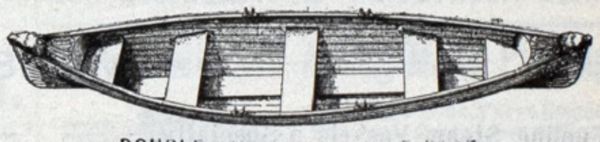
Have many more which are very prominent in actual use. Send in your order and be convinced.

CATALOGUE WITH FULL DESCRIPTION ON APPLICATION

W. H. MULLINS, 252 Depot St., Salem, O.



"GET THERE" DUCKING BOAT.



DOUBLE ENDER PLEASURE BOAT.

PINTSCH GAS LIGHTED BUOYS.

Adopted by the English, German, French, Russian, Italian and United States Light-House Departments for channel and harbor lighting; over 500 gas buoys and gas beacons in service.

BURN CONTINUOUSLY from 80 to 365 days and nights without attention, and can be seen a distance of six miles.

BRILLIANT AND STEADY ILLUMINATION.
ECONOMICAL AND RELIABLE IN OPERATION.

Controlled by the **SAFETY CAR HEATING AND LIGHTING CO.,**
160 Broadway, NEW YORK CITY.

FOR SALE.

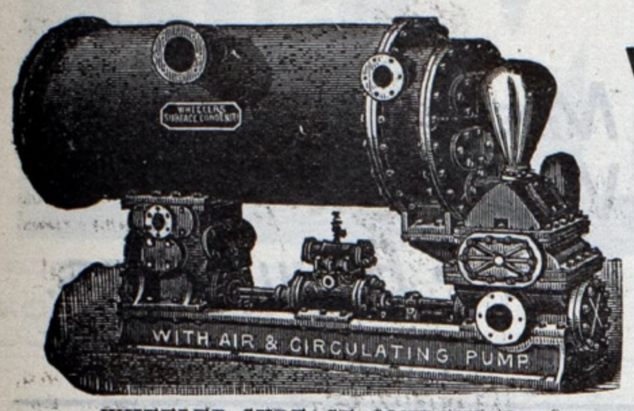
SLOOP ...YACHT.

Bran new, 29 feet over all, 17 feet on the water, 8 feet beam, has fin keel with 1,000 pounds of lead on the same, new set of sails, air chambers enough to float her in case of accident, under deck and out of sight, can easily beat any boat of her class owned in Toledo, O., where there are some of the fastest on the lakes. For further particulars apply to Lock Box 291, Toledo, O.

For Stationary, Portable, Traction Engines, Tugboats, &c.
Thoroughly Reliable—Perfectly Automatic.
JENKINS BROS., - Selling Agents,
NEW YORK, BOSTON, PHILA., CHICAGO.

Wheeler Condenser & Engineering Co.,

39 & 41 CORTLANDT STREET, NEW YORK.



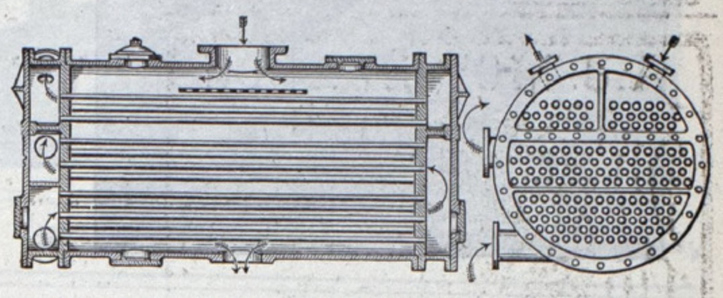
WHEELER SURFACE CONDENSER,
Mounted on Combined Air and Circulating Pumps.

WHEELER'S IMPROVED SURFACE CONDENSERS

Mounted upon Combined Air and Circulating Pumps.

Sole Proprietors and Manufacturers of the
WHEELER STANDARD SURFACE CONDENSER.
WHEELER ADMIRALTY SURFACE CONDENSER.
WHEELER LIGHT HALL SURFACE CONDENSER.
VOLZ PATENT COMBINED SURFACE CONDENSER AND FEED-WATER HEATER.
WHEELER FEED-WATER HEATER, AIR AND CIRCULATING PUMPS.
EDMISTON PATENT FEED WATER FILTER.

Send for Pamphlet, "Machinery for Small Boats, etc."



PATENT COMBINED SURFACE CONDENSER AND FEED-WATER HEATER.

P. M. CHURCH & CO.

SAULT STE. MARIE, MICH.,

Ship Chandlery,
Hardware, Paints, Oils,

And all classes of
VESSEL SUPPLIES.
Coppersmith Shop in connection.

Corner Portage and Ashmun Sts.

TELEPHONES; - {OFFICE NO. 7. RESIDENCE NO. 4.

Attention Vessel Men.

The undersigned has been appointed Receiver for the Vessel Owners' Towing Company, of Chicago, by the Circuit Court of Cook County, Illinois.

THE COMPANY OWNS THE FOLLOWING TUGS:

NAME.	Boiler Inches.	Engine.	Over all	Keel....	Beam...	Depth..
A. G. Van Schaick..	15x78	22x22	82	67.5	14.6	8.1
Protection.....	15x79	22x20	90	77.4	15.8	8.9
Calumet.....	14x75	22x22	79	64.2	17.8	8.6
D. T. Helm	14x72	(2) 17x17	83	68	18	9.3
E. P. Ferry	12x72	20x20	80	66.8	15	7.6
Black Ball No. 2....	12x72	18x20	73	58.6	15.5	8.4
A. A. Carpenter ...	12x72	18x20	75	60	15.6	8.6
Thomas Hood.....	13x72	18x20	71	59.5	15.6	8.6
J. V. Taylor.....	13x72	18x21	75	60.8	15.6	8.6
Satisfaction	12x72	18x20	73	58	15	8
M. Shields.....	12x66	18x20	76	62	14.6	8.2
Rebel.....	10, 6 x 60	16x18	66	54	14.6	7.8

I will be pleased to receive offers at once for any or all of above tugs.
Yours very respectfully,
J. L. HIGGIE, JR.,
Receiver Vessel Owners' Towing Co.

Plan Your Summer Outing Now. Go to Picturesque Mackinac via THE COAST LINE.

It only costs $13.50 from Detroit, $15.50 from Toledo, $18.00 from Cleveland for the round trip, including meals and berths. One thousand miles of lake ride on new modern steel steamers for the above rates. Send 2c. for illustrated pamphlet. Address
A. A. SCHANTZ, G. P. A.,
Detroit, Mich.

Uniformed colored porters attend to the wants and comfort of first and second class day coach passengers on the through trains of the Nickel Plate Road. Rates lower than via other lines. 135—27

You save from $1.50 to $3.00 by purchasing tickets via the Nickel Plate Road. Solid trains and through sleeping cars between Chicago, Buffalo, New York and Boston. 136—27

THE CHASE MACHINE COMPANY.

MACHINISTS, ENGINEERS AND BLACKSMITHS.

MANUFACTURERS OF

Land & Marine Engines & Steam Pumps,

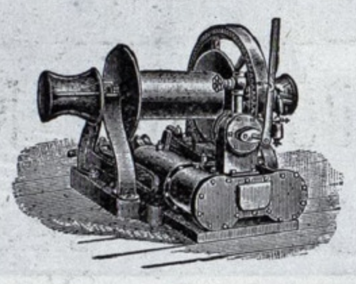
SOLE OWNERS AND MANUFACTURERS OF THE

CHASE AUTOMATIC FOG WHISTLE MACHINE,

IN USE ON NEARLY ALL LAKE STEAMERS.

Agents for ASBESTOS STEAM, BOILER AND PIPE COVERING.

Telephone 994. **111 Elm Street, CLEVELAND, O.**



Dock and Deck Hoists.

ALL KINDS OF

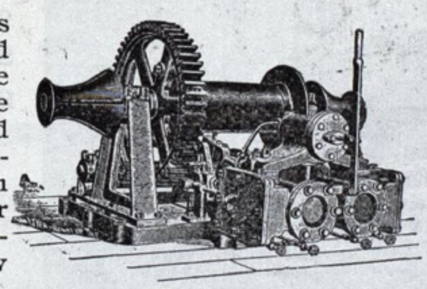
Machinery and Friction Hoists.

JACKSON & CHURCH, *Saginaw, Mich.*

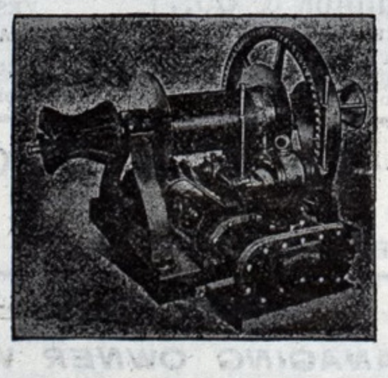
Send for Prices ..and Circulars.

HOISTING ...ENGINES

We build them in all sizes from new and improved designs. Every engine thoroughly tested before leaving our shop, and guaranteed to be satisfactory in every case. When in want of a Hoist for marine work, dock work, mining or any other purpose, kindly permit us to name you prices. We know we can please you.



MARINE IRON CO., - - BAY CITY, MICH.



DECK HOISTS

Coal and Contractors' Hoists,
Steam Steering Gears and
Conveying Machinery
For all Purposes.

MANUFACTURED BY **W. H. WHITTEMORE,**

WRITE FOR PRICES. *WEST BAY CITY, MICH.*

MARINE GLASSES

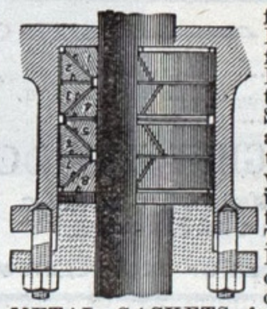
BAROMETERS
COMPASSES
TELESCOPES

Bring Your Repairs to us.
We Repair Everything in the Nautical Line.

FREE Our "card" rules for foretelling weather. Adagted for use with Auroid Barometer. Every vesselman should have one.

L. BLACK & CO., Opticians,
156 Woodward Ave., DETROIT, MICH.

Katzenstein Self-Acting Metal Packing



for Piston Rods, Valve Stems, Etc., of every description, for Steam Engines, Pumps, Etc. Adopted and in use by the principal Iron Works, Steamship Companies, Mills and Engine Builders, Electric Light and Power Plants within the last twelve years in this and foreign Countries. Also FLEXIBLE TUBULAR METALLIC PACKING for Slip-Joints on Steam Pipes and for Hydraulic Pressure. Also METAL GASKETS for all sizes and shapes of flanges. Double-Acting Balanced Water-tight Bulkhead Doors for Steamers. Also Agents for the McColl-Cumming Patent Liquid Rudder Brake.

L. KATZENSTEIN & CO., General Machinists, Brass Finishers and Engineers' Supplies, 357 West Street, NewYork, N.Y.

J. J. KEENEN, RIVERSIDE STEAM BOILER WORKS.

Marine, Locomotive and Stationary Boilers.
Marine Work a Specialty.

SHEET IRON WORK OF ALL KINDS.
REPAIRING PROMPTLY ATTENDED TO.
Office and Works, Cor. Cologne and Fuller Streets,
CHICAGO.
Telephone, Canal 401

J. H. OWEN, Prest., Chicago. F. H. VAN CLEVE, Sec'y, Escanaba. Capt. GEO. BARTLEY, Supt., Escanaba.

ESCANABA TOWING & WRECKING CO., Escanaba, Mich.

Tugs, Lighters, Steam Pumps, Hawsers, Hydraulic Jacks and Diving Appliances always ready

TUG MONARCH—Engine Compound, Cylinder 16 & 30 in. diameter, 30 in. Stroke, Steam Pressure allowed, 125 lbs.
TUG DELTA—Cylinder 20 by 22, Steam Pressure allowed, 105 lbs.
TUG OWEN—Cylinder 20 by 20, Steam Pressure allowed, 104 lbs.

CENTRIFUGAL PUMPS. **SEVEN AND FOURTEEN INCH SUCTION.**